This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

MAR. 15 1945

Massachusetts

REPORT

OF THE

STATE BOARD

ON

DOCKS AND TERMINAL FACILITIES.

JANUARY, 1897.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1897.

HARVARD UNIVERSITY
MAR 1[illegible].945
GRADUATE SCHOOL
OF PUBLIC ADMINISTRATION
HARVARD [illegible] LIBRARY
DEPOSITED BY
MASSACHUSETTS STATE LIBRARY

STATE BOARD ON DOCKS AND TERMINAL FACILITIES.

WOODWARD EMERY.

J. R. LEESON.

CLINTON WHITE.

[Chapter 291, Acts of 1895.]

AN ACT

To provide for an Investigation of the Wants of the Port of Boston for an Improved System of Docks and Wharves, and Terminal Facilities in Connection therewith.

Be it enacted, etc., as follows:

SECTION 1. The governor, by and with the consent of the council, shall appoint a board of inquiry to consist of three persons, of whom the chairman of the board of harbor and land commissioners may be one, who shall hold office for one year from the first day of April in the year eighteen hundred and ninety-five. Said board shall consider and investigate the following subjects: — First. The policy of a public ownership and control of docks and wharves; the advantages and disadvantages of this form of control in other ports of the United States; the extent to which it has been adopted in foreign ports, and the reason why it has been considered essential to commercial development in certain seaports. Second. If the system of public ownership of docks and wharves is elsewhere of general public advantage, can such a system be established in Boston with advantage to the public interests, in view of the existing ownership of docks and wharves in that city and the conditions under which the commerce of the port is carried on? Third. If public ownership of a system of docks and wharves in Boston is advisable, in what manner can the necessary water front best be acquired and improved and used so as to practically inaugurate such a system? What will be the probable cost of such an undertaking? In what way can the needed money best be obtained? How should it be expended, and who or what authority or agency should have charge of the construction of new docks, and the maintenance of the system when in operation? Is it advisable to restore to the Commonwealth the ownership and control of all or any of the flats in Boston harbor not now owned by the city of Boston? Fourth. What changes are necessary in regard to railroad terminal facilities and connections with said docks and wharves? Does the public necessity and convenience in connection therewith require the abolition of any grade crossings of highways or railroads; and if so, how can the same be accomplished? Fifth. Has business been diverted from Boston or from any other portion of the Commonwealth by discrimination in the matter of freight or wharfage charges, or for any other reason; and if so, how can the present conditions be remedied?

SECTION 2. Said board may receive such compensation and incur such expenses as the governor with the advice and consent of the council may authorize, the same to be paid out of the treasury of the Commonwealth from any moneys not otherwise appropriated.

SECTION 3. Said board shall report to the next general court in print, stating the results of the investigation aforesaid, and if they recommend any legislative action they shall embody in their report a draft of a bill in accordance with their recommendations.

SECTION 4. Said report shall be filed with the secretary of the Commonwealth on or before the first Wednesday of February in the year eighteen hundred and ninety-six.

SECTION 5. This act shall take effect upon its passage. [*Approved April 17, 1895.*

[Chapter 68, Resolves of 1896.]

RESOLVE

Extending the Time for the Report of the State Board on Docks and Terminal Facilities and providing for the Continuance of the Investigation relative thereto.

Resolved, That the time allowed for the filing of the report of the state board on docks and terminal facilities, required by chapter two hundred and ninety-one of the acts of the year eighteen hundred and ninety-five, providing "for an investigation of the wants of the port of Boston for an improved system of docks and wharves and terminal facilities in connection therewith," is hereby extended to the first Wednesday of January in the year eighteen hundred and ninety-seven; and a sum not exceeding five thousand dollars, in addition to any amount heretofore authorized, may be expended for the purpose of completing the investigation provided for in said act; and the term of office of said commission is hereby extended to the first day of April, in the year eighteen hundred and ninety-seven.

Commonwealth of Massachusetts.

REPORT

OF THE

STATE BOARD ON DOCKS AND TERMINAL FACILITIES.

To the Honorable the Senate and House of Representatives of the Commonwealth in General Court assembled.

The State Board on Docks and Terminal Facilities, established by chapter 291 of the Acts of 1895 as a board of inquiry into the "Wants of the port of Boston for an improved system of docks and wharves and terminal facilities in connection therewith," have the honor to make the following second and final report.

Pursuant to the provisions of chapter 291 of the acts aforesaid, the State Board on Docks and Terminal Facilities organized and proceeded to work, as recited in its preliminary report to the last Legislature, House Document No. 650, 1896.

Therein an account was given of the meetings of the Board and the testimony presented relative to the matters inquired of in the act creating the commission; of the visit by a committee of the Board abroad, when 17 of the principal seaports in Great Britain and on the continent were examined, and conferences were had with the United States consuls and

leading merchants and officials of the places visited; of similar inspections of the chief Atlantic sea-ports at home, where, as abroad, every opportunity for inquiry that courtesy could prompt was freely availed of; and of the realization by the Board that the time originally given was too short to permit of due consideration of the problems presented. In consequence, an additional year was given by chapter 68 of the Resolves of 1896.

During this time also, while the office has been continuously open in business hours and stated sessions of the Board held daily, the commissioners have been fully occupied in holding meetings, carrying on correspondence and collecting data from all parts of the world, and in digesting and assimilating the same for application to the conditions existing here. Without tedious iteration of details, however, we will proceed to give a brief account of the rise of the subject of investigation and the treatment accorded it.

History Leading to the Establishment of the Board.

The annual report, for the year 1893, of the surveying department to the mayor of the city of Boston, dwells on the desirableness of increasing accommodation for the growth of the commerce of the port, by supplying new and economical facilities. That was shortly followed by a pamphlet of 24 pages, illustrated with elaborate maps, issued by the East Boston Company, and entitled "Conditions of commercial success: what Glasgow, Liverpool, Manchester and Hamburg have done and are doing; what Boston can and should do." This was generally distributed among the leading merchants of Boston.

In October, 1894, a joint special committee on improvement of docks and wharves, of the city council of Boston, in pursuance of an order, made a report, in which they found

"that there is not any public department, State or municipal, having supervision of the business of the docks and wharves, of their capacity or size or of the uses made of them." The report continues: —

The number of wharves in Boston, both above and below bridges, is in excess of two hundred, and they are all private property, used for private purposes, and any information respecting them, and the business transacted on or about them, is only attainable from, and is dependent on the good-will of, the proprietors.

Nevertheless, the condition of the docks and wharves and their adaptation to subserve the interests they were intended to promote, although their construction, control and management were intrusted to private persons, are matters of public interest and concern. They are the gateways between the ocean and the land, and commerce requires easy and free access between them, with every possible facility for the safe, cheap and speedy transfer of persons and property between the land and the sea-going vessels. Commodious docks with deep water, and substantial wharves having ample areas for the reception of merchandise and for its prompt and ready movement by railway trains and vehicles of every description, without interference or confusion, together with appliances for handling heavy cargoes, are all essential to the transaction of the business of modern commerce.

The committee expressed their belief that "it is the right and duty of the municipal government to provide for the full development of the commercial possibilities of the city," and they reported, submitting a plan for a system of docks and wharves, and recommended the passage of the following order: —

Ordered, That His Honor the mayor petition the General Court at its next session for such legislation as may be necessary for the establishment of a modern dock system, under public ownership, in Boston harbor.

This order was adopted.

At the same time the subject of public docks was under discussion at meetings of the Board of Trade of Boston, and

many valuable documents and reports were accumulated which subsequently were turned over for the use of this commission.

Contemporaneously, the Boston Merchants' Association petitioned the Legislature, and filed therewith a bill, being House Document No. 255, entitled "An act to provide for an investigation of the wants of the port of Boston for an improved system of docks and wharves, and the ownership and maintenance thereof by public authorities, whether State or local."

A bill, being House Document No. 345, entitled "An act for the purpose of restoring to the Commonwealth the ownership and control of the unimproved harbor front of the northerly side of Boston harbor, not already owned by the city of Boston, and of developing and improving the same," was likewise introduced, as well as a bill, being House Document No. 496, entitled "An act relating to the commercial facilities of the city of Boston."

These bills were referred to the committee on metropolitan affairs, who reported a bill which became a law, chapter 291 of the Acts of 1895, under which this Board was constituted.

The "Wants of the port of Boston for an improved system of docks and wharves" demand that attention should first be given to the approaches.

Without adequate waterways from the ocean to the docks, commerce would have obstacles to surmount which would be incompatible with the desired growth. The first consideration of the Board, therefore, was devoted to the question of providing deep and broad entrances to the harbor, suitable for vessels of such dimensions as will be needed in caring for the commerce of the future. After that is assured, the loading, landing and anchorage facilities adequate for a great commerce may be planned to advantage.

The Harbor.

The harbor of Boston is one of the fine harbors of the world. Within its entrance are found ample roadsteads and secure anchorage, and, by reason of its numerous islands, abundant shelter.

In the 1896 annual report of the accomplished United States engineer in charge at Boston to the chief of engineers of the United States Army, the harbor is thus described: —

Boston harbor consists essentially of an inner and outer harbor, united by a deep waterway, and each accessible from the sea by a distinct channel, widening into a deep and spacious roadstead.

1. Inner Harbor. — This harbor lies to the north and westward of Long Island, and has deep water and good anchorage in the President Roads, seaward of Lower Middle Bar, and also near the city westward of Upper Middle Bar.

Four rivers discharge their waters into the basin, — the Charles, Mystic and Chelsea rivers from the north, and the Neponset from the south. The direct entrance from the sea is by Broad Sound.

2. Outer Harbor. — This harbor lies to the southward of Long Island, and has a fine anchorage in Nantasket Roads as well as in Hingham Bay, a well-sheltered harbor south-east of Paddocks Island. It connects with the inner harbor by the main ship channel, through the Narrows, and by secondary channels east and west of Long Island. It is reached from the sea by Nantasket Roads, which lie south of Georges and Great Brewster islands, and is marked at the sea entrance by Boston Light.

Weymouth and Weir rivers empty into the outer harbor.

Both the inner and outer harbors are subdivided into several minor harbors, and contain many islands, which shelter the anchorages from winds and storm waves.

The range of the tides at the navy yard is 9.8 feet, and at the entrance to the outer harbor 9.4 feet.

Up to a recent date the main ship channel was adequate for the requirements of the commerce of the period. The increase of length and draught of the modern steamship is such, however, as now to require wider and deeper waterways than have hitherto been sufficient. The bounty of nature, not content

with one good channel, has given several; and it is highly probable that the one which the lighter-draught vessels have been accustomed to use in passing in and out, called Broad Sound Channel, by the removal of rocks and shoals can be made serviceable for vessels of the largest type.

The committee on rivers and harbors of Congress, who visited the harbor of Boston last spring, became interested in this needed improvement. The Federal government has been aroused, and a survey for the desired channel through Broad Sound will undoubtedly be made in the coming spring, to be followed, it is to be hoped, by the necessary appropriation and work.

The proposed channel will be nearly a direct course from Long Island Light out to sea, having a least width, we trust, of 2,500 feet, and a depth at mean low water of not less than 30 feet. The dangerous cross-currents which exist at the union of Black Rock Channel with the present main channel will be avoided. Vessels, in approaching and entering between Nahant and The Graves, upon both of which adequate lights should be placed, will sail in a straight course through a buoy-lighted passage into President Roads.

When this shall be accomplished, in addition to the main ship channel, Boston harbor will have a magnificent thoroughfare of unrivalled character, capable of accommodating the commerce of the future, however great, and affording a safe and easy approach and entrance to the harbor in any kind of weather and at all stages of the tide.

The surface area of water inside the harbor, or west of a line extended through Point Allerton, Lovell's and Deer islands, is large, covering some 46 square miles, over 13 of which there is a depth of 18 feet at mean low water, and 8 square miles of the 13 give a depth of 24 feet and over.

Near the city, in the upper harbor, the anchorage is wholly insufficient, and a growing commerce would be badly inconvenienced if a way is not found largely to increase it. A way

will be recommended later in this report. The various outer roadsteads, however, are ample, affording room for fleets of vessels to ride at anchor. Hingham Bay contains about 800 acres; Nantasket Roads, about 1,650 acres; Georges Roads, about 500 acres; President Road, about 960 acres, — or, in all, about 3,910 acres.

It is, perhaps, unnecessary to enlarge upon the signal natural advantages of our harbor, which are obvious to the most superficial observer. Instead of costly stone basins in which the level of water is maintained by expensive machinery and gates, and whence ingress and egress can be made only at times of high water, as is the case in many of the leading ports of the world, comparatively cheap pile, or stone and pile, structures are sufficient to supply our needs. Instead of costly excavations out of solid ground to supply the needed space for docks, — as was required at Liverpool, Glasgow, Preston, Antwerp, Manchester and other places, — here it has been necessary to establish a harbor line in order to prevent the encroachment of merchants desirous of making cheap territory for building lots. Instead of river channels, widened, straightened and deepened for miles in length at enormous cost, — as was done at Newcastle-upon-Tyne, at Glasgow on the Clyde, Rotterdam on the Maas, Hamburg on the Elbe, Antwerp on the Scheldt and elsewhere, — here nature has made deep waterways to our very storehouse doors; and the smallest outlay, when considered with reference to the millions expended abroad, will give us channels fit for the largest ships to navigate with safety.

When nature's great gift in locating this harbor about two hundred miles nearer the European markets than any other great American port is considered, it becomes evident that no more than fair intelligence and enterprise are needed to enable this port to compete most favorably for a large share of the ocean commerce of the world.

Public Ownership and Control.

Having discussed how to provide for an adequate harbor entrance, without which interior development would be worse than useless, we are now ready to consider: —

I.

"The Policy of a Public Ownership and Control of Docks and Wharves; the Advantages and Disadvantages of this Form of Control in Other Ports in the United States; the Extent to which it has been adopted in Foreign Ports, and the Reason why it has been considered Essential to Commercial Development in Certain Sea-ports."

The communal instinct and effort in behalf of getting trade is universal and as old as the history of commerce. The merchant on the high seas has everywhere and at all times received the protection of his government. The Phœnicians and Greeks built harbors and convoyed fleets. The ancient sea-ports of Carthage, Athens, Venice, Genoa and the rest were the direct product of the communal principle, as was also the growth of the towns of the Hanseatic league and other ports of the middle ages. All the ports of modern Europe have been developed by public enterprise in various forms, instigated by communal interest.

The sea-ports of Great Britain, London almost alone excepted, owe their growth and prestige to municipal enterprise acting under parliamentary grants with various powers and forms of management.

In our own country the same necessity for united action and unwillingness to rely on the result of individual interest is indicated in the situation at San Francisco, where the State owns the docks and wharves; at New Orleans, where very recently the city has retaken the wharf property from the

hands of lessees, that it may be able to afford increased facilities to commerce; at Philadelphia, where provision is made by recent legislation for the acquisition of the water front by the public, and a widened street and railway connection is projected for the connection of all the wharves on the Delaware River; at New York, where the public are regaining all the water front lost during years of inaction, are at enormous cost removing filling formerly allowed to encroach on the water areas, and are constructing a broad avenue at the head of the docks, all for the purpose of encouraging the growth of commerce.

We might, indeed, go on and name almost every Atlantic sea-port of note, and cite them as evidence of the decision on the part of their respective communities that their success in commerce depends on their united public action, and that individual initiative cannot be relied on to supply a uniform, economical and stable system for developing, in the face of the keen competition of to-day, the accommodation and facilities required for a great commerce.

As we have pointed out, the policy of the public ownership of docks had its origin in remote antiquity, in those ancient sea-ports whose names are preserved to posterity as having been centres of commerce and trade.

Vessels of war have always been necessary for the protection of a merchant marine, just as sea-ports were, and are, essential as a base of supplies and repair for the navy. It is natural, therefore, to look for State ownership and control of the waters and shores in the old world, and to find the policy entrenched behind reasons of State, embedded in tradition and custom.

In the United States, with few exceptions until quite recently, the ownership and control of the docks and wharves have been private. This remark applies to railroad ownership of such property, because, while railroads have public functions, their dominant interest is to earn dividends for

individual stockholders. A list of the more important seaports of the United States, classifying the ownership and control of docks and wharves, is given as follows:—

Portland,	Railroad and private.
Boston,	Railroad and private.
New York,	Public, railroad and private.
Philadelphia,	Railroad and private.
Baltimore,	Public, railroad and private.
Norfolk,	Public, railroad and private.
Newport News,	Railroad and private.
Savannah,	Railroad and private.
Charleston,	Railroad and private.
New Orleans,	Public, railroad and private.
Galveston,	Railroad and private.
San Francisco,	Public.

Among the cities named in the foregoing list there are some which, in one form or another, under stress of the recent severe competition between great business centres and municipalities now acting as units, where heretofore individuals and corporations were the competitors, have, after careful consideration, declared in favor of a system of public docks and wharves.

There are natural reasons why private ownership should exist in this country to the extent indicated in the foregoing table. Commerce rose from small beginnings, and as a result of individual enterprise. Abundance of room on the shores and in the navigable waters invited occupancy without infringement on the rights or convenience of others, and the nascent public encouraged every enterprising tendency. There came a time, however, when inconvenience, or increase in cost, or necessity for economizing, or lack of business, or congested conditions, or some other moving reason, brought about a change and an effort to adapt things to more satisfactory ends. Within the last few years there have been great efforts made in all the Atlantic sea-board cities above named, with a view to increasing the commerce of their ports. The smaller ports fancied that their interests lay in closer union

with the railroad companies; and in some instances, as at Newport News and Tacoma, the railroad has really made the port. But the great commercial centres, like New York, Philadelphia, New Orleans and San Francisco, realizing the evils of a too great dominance of railroad influence or of any single or combined power, have sought, under various forms of management, to preserve to the public forever the right to use its wharves and docks for such purposes and in such manner as the public welfare may from time to time demand.

New York.

The docks and wharves of the city of New York are largely owned by the municipality, under a grant in colonial times giving it the ownership of the shores of Manhattan Island. Notwithstanding this grant, however, about half the water front is claimed and owned as private property, and has been acquired at different times and in various ways in derogation of public right. Yet the larger number of the wharves are still owned and controlled by the municipality, and are under the management of the department of docks, which was established in the year 1870, largely on account of the difficulties and disturbances growing out of private ownership, and also for the purpose of recovering and restoring to the city the frontage already appropriated by private individuals.

Previous to the organization of the dock department, in 1870, there had been no systematic plan of construction of wharves around the city, each occupier building to suit his own convenience. The Dock Board, upon assuming control of the water front, found the facilities inadequate for the growing commerce of the city, and plans were made and adopted which compelled private owners to conform to rules and regulations in the reconstruction of their wharves.

Since the formation of the Dock Board there has been spent in the acquisition of the water front, the construction and repair of docks and wharves and in the cost of maintaining

the same, more than $25,000,000 of public money, which has largely been reimbursed out of the income received for the use of the docks and wharves. The policy of the Board has been, and is, to provide accommodation for the commerce of the port in advance of its actual needs. The piers at New York are not calculated for, neither are they maintained as, storage warehouses. They are maintained largely for the receipt and delivery of water-borne commerce, and not as depots for the assembling and storage of cargoes. With few exceptions, the piers of New York have no direct rail-connection with the different lines centring in the city. The merchandise received from and delivered to steamships is very largely transferred by lighters and car floats.

Under the management of the department of docks an improvement in values has resulted. It has restored to the city many piers occupied by private individuals who claimed the ownership. In 1890 a Board of United States Engineers established a bulkhead line around the island, upon which the department has already built three miles of solid masonry wall, to be continued until the island is entirely surrounded. Under the direction of the department a systematic construction of wharves, by carefully considered projects applicable to the entire water front, is continually going on. Under its management leases of this kind of property are made for terms varying from ten years down to those terminable at the pleasure of the Board, at rentals varying from $50 up to $100,000 a year under one lease.

For the purpose of fulfilling the objects for which the department was created, it has been granted large powers. It has exclusive charge and control, subject in certain particulars to the commissioners of the sinking fund of the city, of all the wharf property belonging to the city, including the docks, water fronts and land under water; also of the building, repairing, leasing and dredging of, in and about the property, together with exclusive government and

regulation of all other wharf and adjacent water property; also it may take by purchase or by right of eminent domain any and all the water front of the city; and may establish rules and regulations and fix penalties for disobeying the same, by fine not exceeding $500 or thirty days in prison.

Plans for extensions are pressed forward, under demand for increased accommodation. The latest plan which has received the approval of the Board of Consulting Engineers, and will require an expenditure of about $9,000,000, is for the reclaiming of a portion of the water front on the North River, between Charles and Gansevoort streets, in order to permit the building of long piers suitable to the requirements of ocean steamships of the present day. With reference thereto, the sub-committee on the improvement of the water front reported to the committee of seventy, — a committee of leading citizens and merchants of New York city, appointed in 1895 to investigate the departments governing the city, — as follows: —

Many years ago authority was given by the Legislature to fill in the North River above West 11th Street to such an extent that the river was materially narrowed at that point. It was supposed that the commerce of the city would never need to enter what was then this far-away section. More recently we have seen the same short-sighted policy applied to sections of the water front which now seem to us equally remote. The future will probably show equal need of correction of the mistake. By the filling in at and above West 11th Street it has been made impossible to have any piers suitable for any considerable use built in this section of the city for a distance of nearly a mile. The plans of the general government and of our local government, for reasons that are conclusive, prohibit it.

This section of the city is now urgently needed to provide suitable accommodation for our greatly crowded commerce. It is difficult to exaggerate the importance of restoring this most important district to modern commercial use. It would relieve for many years the congestion in the busiest commercial part of the city, and afford a means of supplying the demands which are continually being made, and which it is criminal to disregard, if, in any reasonable way, they can be supplied: The department of docks has for many years be-

urging this improvement on the proper authority, and finally it has been given the power to restore this most important section to commercial use.

The plans involve the purchase of this land and dredging out the filling to such an extent as to enable the city to build into the river piers of suitable length. Plans have already been approved by the sinking fund commission, which, when carried out, will result in adding five new piers in this section. If the plans for the whole section alluded to could be approved and executed, something like seventeen new piers could be added to those at present available for commercial use.

With reference to this improvement, the president of the Dock Board recently said that "reckoning upon the basis of the recent award of the commissioners of estimate and assessment of $581,074.65 for the northerly half of the block between Bethune and Bank streets, North River, the total cost of the property to be acquired between West 11th and Gansevoort streets would be $5,524,200, exclusive of the cost of improvements, which would amount to $1,588,800, — thus bringing the aggregate estimated cost up to $7,113,000. It was to be regretted that the undertaking had not been commenced years ago, both on account of the fact that the property could then have been secured at lower figures, and also on account of the commercial interests of the city, which have already suffered on account of the delay."

In this connection it should be noted that the proposed improvement contemplates a marginal street at the head of the piers on the North River of from 100 to 250 feet in width, for the better handling of the immense traffic which will centre there.

As to the form of control, let it be judged by its works. But already it would seem to have met the approval of the committee of seventy, as appears from the report of its sub-committee, which says: —

Roughly speaking, about half of the water front is owned by the city and half by numerous private parties. To develop this water front in a manner suitable for its highest use; to govern and regu-

late such use, both for public and private property, by proper rules and regulations; suitably to apportion districts for particular classes of commerce; and properly to regulate the kind of facilities which shall be permitted to exist over its varied portions, — require, in the first place, an appropriately organized body of officials, and next, a body of laws which will enable such officials to accomplish the purposes of their office.

The powers granted must be large, and much must be left to discretion. The results attained will, of course, depend largely on the kind of men intrusted with the power. Here, as everywhere else, good government depends finally upon the intelligent administration of suitable laws by suitable men. The committee knows of no other road leading to good government.

First. — This committee finds a department of docks organized under the laws, consisting of three commissioners. The committee believes that this is the best and most suitable plan of organization. The powers to be exercised are vast, largely discretionary, and many of them such as were always exercised by the Legislature of the State prior to the organization of the dock department. These powers are properly legislative, and should be exercised in accordance with the legislative method, thus insuring publicity and discussion. A commission is therefore proper, and three is the smallest number of which it can be composed.

Philadelphia.

Philadelphia is located one hundred and three miles from the sea, at the junction of the Delaware and Schuylkill rivers. There is a water front on the two rivers of thirty-three miles fit for the use of commerce. Her docks and wharves have hitherto been developed under private ownership and management. The struggle for maintenance of her commercial position among the Atlantic ports necessitated far-reaching improvements in both the approaches from the bay to the city and in the character of accommodation at her wharves.

The first requisite (and in that respect she resembled Boston) related to the improvement of her harbor, concerning which a United States advisory commission reported in 1888. Subsequently the Federal government undertook to remove certain islands and shoals for the purpose of improving the navigation of the Delaware River, with the understanding that

the city should plan and carry out a substantially new water front by a carefully prepared project, which was intended to give new and increased facilities for ocean commerce. The dredging involved amounted to 22,000,000 cubic yards of material, at an estimated expenditure of $4,200,000. This figure includes the cost of real estate, amounting to over $700,000.

Contemporaneously the city of Philadelphia, authorized by the Legislature and guided by its Board of Harbor Commissioners, undertook the improvement of the water front. Bulkhead and pier-head lines were laid down. Delaware Avenue, which runs along at the head of the docks, was broadened to 150 feet on the river side by setting the bulkheads outward into the docks, with a view to being filled solid, and paved out to the bulkhead line. The plan adopted in connection with the widened avenue provides for the extension of wharves from their present short length to 550 or 700 feet, with a width of 75 to 100 feet, and dock spaces averaging 200 feet between.

The remodelling of the water front is to be in conformity with the recommendations of the Board of Harbor Commissioners; and when notices have been given in writing to the owners of properties to be affected by the particulars of the construction required, and a failure is continued for a period of six months thereafter to begin and prosecute the work of removal or reconstruction as prescribed in said notice, the city shall have power to condemn and appropriate the properties and riparian rights, and the same shall become vested in the city, the owner receiving compensation for the taking.

Thus it will be seen that in furthering the interests of commerce at the port of Philadelphia the public authorities have been empowered to change the water front, to remodel the whole system of wharves and docks and to assume improved property for the purpose of carrying out the project in

cases where private owners are unwilling to conform to the plans.

In order to perfect this project and to give this increased accommodation the required efficiency, a belt-line railroad company, was organized with the right to construct its railroad and branches along Delaware Avenue and across side streets in such manner as to become connected with all wharves, and, when constructed, to be open to the use equally of all the railroads.

Moreover, in order to secure to the public at all times the benefits of the railroad, a voting trust for all stock of the railroad company was provided for, and provision made for a gift of 51 per cent. of the stock to such corporation and persons as may be legally competent to act thereunder, "to the end that the said railroad may be forever maintained for the common use of all railroads upon equal terms without discrimination." To insure in the management of this railroad independence from the influence of individual interests, it is provided that the voting trust shall be composed of five members, one of whom shall be the Girard Life Insurance Annuity and Trust Company of Philadelphia, one shall represent the stockholders, and the remainder shall represent the commercial interests of Philadelphia, and be elected by the Philadelphia Board of Trade and the Commercial Exchange.

In the 1896 report of the Commissioner of Navigation to the Secretary of the Treasury, on page 39, the following reference appears: —

"The city of Philadelphia has recently appropriated $815,000 for the improvement of the approaches to its wharves. These evidences of aroused municipal interest in the business value of shipping to a port and of a willingness to spend money and reduce or abolish port charges in order to attract it must compel other American sea-ports to follow the examples set or else accept a lower rank in the list of our great centres of international trade."

Baltimore.

By virtue of the statutes of Maryland, the control of the harbor of Baltimore is vested in the mayor and city council, who by proper ordinances have established a Harbor Board, composed of the mayor and six citizens at large. To them is committed the control of all matters connected with the harbor and the expenditure of such moneys as may be appropriated.

The State owns two wharves on which are warehouses, wherein any citizen of Maryland who raises tobacco has a right to store it as long as he chooses, without charge other than the payment of $2 a hogshead on removal of the same. If sold while in store, the buyer may have six months' free storage. At the ends of some of the streets there are a few wharves and an enclosed dock, called the city dock, all owned and controlled by the city, at which boats with garden truck, and small steamboats, are furnished landings.

The rest of the ownership is private. The principal wharves at which the bulk of the grain and other large steamship business is done are connected with the Baltimore & Ohio terminals at Locust Point, on the opposite side of the arm of the harbor from the main city wharves, and with the Pennsylvania Railroad at Canton, some distance away. At these railroad docks are found large shedded piers and grain elevators, and all the conveniences and facilities for handling the cargoes of large steamships.

There are six harbor masters, who are appointed in the same manner as other city officials; and among their duties is that of the collection of wharfage and dockage rates, paygin the proceeds to the city register.

There exists at Baltimore a very good system of lighterage, controlled by the railroad companies; also an independent lighterage company. The rates are somewhat less than those at Boston. The arrangements as between the steamships and the railroads at Baltimore are similar to the arrangements

existing at Boston; foreign steamships receive freight from the Baltimore & Ohio and Pennsylvania railroads on similar terms, and receive similar facilities to those given by the railroads at Boston to their foreign steamship connections.

The mixed system of ownership and control at Baltimore seems to work satisfactorily, and there is little or no disposition to have any change effected.

Norfolk.

The wharves and dock property at Norfolk are owned by private individuals and corporations, and a few owned by the city and leased. Wharves and piers have been built and altered to suit the respective requirements of the different steamship and railroad companies. At Lambert's Point, some four miles below the city, toward the north, the Norfolk & Western Railroad have established their terminals for the delivery of coal and merchandise to the steamships. They have a number of piers well adapted to the requirements of their business, and abundant room on the water front for a very large extension should they require it.

On the opposite side of the harbor from Norfolk, at Pinner's Point, are the piers of the Norfolk & Carolina Railroad, and new piers are building for the Southern Railroad, whose export business is now being transferred to this place from West Point, Va.

With the extended railroad system now under control of the Southern Railroad Company, the merchants of Norfolk are of the opinion that the exports of their city will greatly increase. A large amount of merchandise, mostly of cotton, lumber and iron, is sent from Norfolk to Boston; and your committee were told by prominent railroad men at Norfolk that, if Boston had had sufficient transportation from her port to the continent of Europe, twenty thousand more bales of cotton might have been shipped by way of Boston last winter.

The city of Norfolk has recently given to the Southern

Railroad certain wharf rights, covenanting that no discrimination shall be made by the railroad company against their city in favor of any other port.

The wharfage at Norfolk is paid by the steamers, which are charged one cent per ton per day, and all sailing vessels from one-half cent to one cent per ton per day. Most of the principal wharves in Norfolk have railroad connections, giving them good facilities to transfer merchandise direct from the railroads to the steamships.

Newport News.

At Newport News all the docks and warehouses and the elevator are owned by the Chesapeake & Ohio Railroad Company, and are run entirely in the interest of that road, local business not entering into their calculations.

There is a grain elevator of a capacity of 1,700,000 bushels, there are two large coal piers, four merchandise piers, and one pier used for passenger service in connection with the railroads. The warehouses on the piers have a storage capacity of 1,500 car-loads of freight, while the freight yards outside have a storage capacity of 3,500 cars. The railroad company has a large frontage on the bay, about a mile in extent, with 24 feet of water at low tide outside the pier-head line, with a wide channel for anchorage immediately off the piers having a depth of 60 to 70 feet of water. The steamships that run in connection with the railroad have no dockage dues to pay, and are substantially on the same terms as those prevailing at Boston with the regular lines of foreign steamships. The labor charges for handling goods are about 30 per cent less.

One striking arrangement at Newport News is the method of handling and storing export freight at pier No. 4 through a system of freight elevators. Flour, which is there handled in large quantities, is taken from trucks on a lower floor by elevators to the story above, from which it is directly

delivered on board steamers. On the whole, the conditions at this port are very favorable for the rapid and economical handling of all sorts of merchandise; and, with the facilities for obtaining coal cheaply and quickly, it offers great inducements for steamships to go there for cargoes.

At the works of the Newport News Ship Building Company there is located one of the largest and finest dry docks in the country, at which the longest and deepest American steamships are taken in for examination and repair. The facilities at the works for the construction and repair of first-class ocean vessels are ample.

As Newport News is purely a railroad terminal, it cannot be expected to throw much light on the questions here under consideration. Mention, however, is made of it, as the youngest Atlantic port with great expectations.

Charleston.

There is no system of public ownership at Charleston. The principal wharves and warehouses are owned and controlled by a corporation, called the East Shore Terminal and Warehouse Company, who have acquired by purchase most of the available wharves and warehouses on the Cooper River front of the city. They also own and control a belt-line railroad, which connects all the railroads entering the city with the wharves and warehouses. For the sum of $2 as a switching charge, car-loads of freight are taken from the terminus of each railroad and delivered to any wharf or warehouse on the Terminal Company's lines; but where car-loads of freight are unloaded and delivered by the Terminal Company a charge of $3 is made to cover all expenses.

The Harbor Commission for the Bay and Harbor of Charleston is made up of thirteen members, including the mayor of the city, the president of the Chamber of Commerce, the chairman of the State Board of Health, and one of the pilots, having police and general regulating powers similar to, but

somewhat broader than, those possessed by the Massachusetts Board of Harbor and Land Commissioners.

Owing to dissatisfaction with the existing state of affairs, the merchants of Charleston are agitating the question of a public ownership and control of docks and warehouses.

SAVANNAH.

At Savannah the two principal railroads own so much of the river front at each end of the city that they have been enabled to do the greater portion of the shipping business of the port, and consequently the wharves lying between their terminals have depreciated in value 60 to 75 per cent. during the last twenty-five years. Whatever warehouse business is necessary for the import and export trade is also largely done by the railroads.

There is no public ownership of wharf property at Savannah, and therefore no comparison can be made as between public and private ownership.

Under a State law of 1829, now still in force, "The several owners or occupiers of wharves in Savannah shall be allowed to charge, demand and receive the several rates hereinafter mentioned for the wharfage or dockage of vessels lying at the wharves for the landing of produce and other goods, and for the shipping of the same and for the storage thereof, and no more." The prescribed rates vary with the goods, and do not differ much from those which prevail at Boston.

Most of the wharves not owned by the railroads are connected along the water front by switches from the different roads. The switching charge varies from $1 to $3 per car for the delivery of cars from one road to another, or from one road to a wharf along the water front.

The terminals in connection with the Central Railroad are nominally owned by the Ocean Steamship Company, which is a part of the railroad system. They have one grain elevator,

with a capacity of 500,000 bushels. Elevator charges are substantially the same as those in Boston.

Notwithstanding her excellent railroad terminals and wharf accommodation, Savannah has failed to materially increase her foreign commerce, and this is largely owing to insufficient depth of water, which forbids navigation of her river to ocean steamships of the larger class.

New Orleans.

The city of New Orleans lies one hundred miles from the Gulf of Mexico, at the mouth of a magnificent river, whose current cheaply transports to it the products of an immense and fertile territory.

The treatment of the mouth of the Mississippi River by the building of the Eads jetties in 1875 is an instance in this country of the value to a commercial port of the judicious outlay of money by the government. The effect of deepening the mouth of the Mississippi River from 17 to 30 feet, by establishing the Eads jetties in the South Pass, has in twenty years increased the ocean commerce of New Orleans from 454,000 registered tons entered from foreign ports in 1875 to 1,000,000 tons in 1895. In the same time the number of steam vessels has more than quadrupled, and the average capacity and draught greatly increased. Not only has ocean commerce received this great impetus, but the railroad carriage from the interior has increased some 500 per cent. This improvement has resulted in new lines of railroads and greater terminal facilities. During this period the growth of business with San Francisco over the Southern Pacific Railroad increased to such a degree that, it is claimed, 75 per cent. of the transcontinental traffic of the United States is now brought to and through New Orleans.

For many years New Orleans was the second city in the United States in the value of its exports. Within the last three years, however, that position has been taken by the

port of Boston, the value of whose exports in the year 1895 exceeded that of New Orleans by $29,000,000.

The harbor facilities of New Orleans, owing to the great bend of the river, offer some thirty miles of water front on both sides. The wharves and all riparian rights are owned and controlled by the city. Under various ordinances issued from time to time, as occasion warranted, privileges have been given to individuals and corporations in the form of leases or licenses. The charges for the use of piers, wharves and levees are fixed by ordinance and laid upon the vessels which use them, and vary according to the size and class of vessels and duration of the use.

For many years all wharfage charges were collected by officers of the city and turned into the city treasury for the support and maintenance of the wharves and other landings; but, owing to some dissatisfaction with the manner in which the work was carried on, in the year 1891 a lease for a term of ten years was made of a large frontage, comprising about five miles of the wharves and landings. For compensation and profit the lessees were permitted to collect and retain all charges allowed to be made for the use of the property. The rights and privileges under which the lease is given are contained in an ordinance of thirty-two sections, passed April 21, 1891.

The Illinois Central Railroad established its export terminal at Southport on the river Mississippi, some five miles above the business centre of New Orleans, where they have a large elevator, with a capacity of 500,000 bushels, and suitable sheds and piers for handling cotton and other merchandise; while the Texas Pacific and the Southern Pacific are located on the opposite side of the river, and are connected with the city by car-ferries. The facilities of the Southern Pacific at their terminals at Algiers, for the class of business carried on at that point, are not exceeded by terminals at any other port in the South.

Within the past year the New Orleans & Western Railroad Company was organized, with a capital of $6,000,000, for the purpose of building a railroad to connect the lines entering the city of New Orleans, and for the establishment of wharves, elevators, cotton compresses and warehouses on an extensive scale. Unable to obtain land suitable for their terminals in the city of New Orleans, they went to Chalmette, some seven miles below, where they purchased about 2,300 acres with three-fourths of a mile river frontage. There they have erected a large shedded pier, with accommodation for five ocean steamships, a grain elevator with a capacity of 500,000 bushels, and modern compresses, claimed to be the best in the city; also several first-class brick storage warehouses, to be followed by additional ones, which are to have a storage capacity of 250,000 bales of cotton. All the warehouses, presses and piers are connected by a narrow-gauge railroad, upon which, in order to reduce insurance charges, are run engines operated by compressed air. The junction railroad connecting the aforesaid terminals with the different railroads is about 14 miles long, running in the rear of the city, through an open country, with few grade crossings. The charge for switching cars to and from the different railroads is $2 per car.

It is hoped by means of cheap storage to make Chalmette the great storage centre of the world for cotton; and also, by reason of cheap handling of grain and merchandise of all kinds, to furnish inducements for breaking bulk and storing or changing conveyance.

The building of the jetties and consequent deepening of the channels has greatly changed the commerce of the port, and now large ocean steamships have taken the place of sailing vessels. The loading berths of steamers were widely scattered along the water front, and the railroad connections were inconvenient and necessitated expensive cartage. The ten-year lease of so much wharf frontage, with the right to

collect tolls and make charges on the old basis, was found to be prohibitory of modern business, and a decline set in. The building of Chalmette was a private enterprise, and failed to meet the situation. It was, therefore, decided that tolls on vessels must be reduced at all the docks, and that the power which had secured possession of the wharves must be unseated. After mature deliberation, the representatives of the merchants and commercial bodies reported that, "with the keen competition from other ports and the general tendency of business to seek ports which offer the best opportunity for the cheap handling of freight, nothing short of free wharfage will relieve the situation."

This agitation, aroused with a view to lowering port charges, culminated in an act of the General Assembly of Louisiana, being Act No. 70, passed in July, 1896, establishing a Board of Commissioners of the Port of New Orleans, with power to regulate the commerce and traffic of the harbor in such manner as may in their judgment be best for its maintenance and development; to administer the public wharves; to construct new wharves where necessary; to erect sheds thereon for the protection of merchandise in transit; to place and keep the wharves, sheds and levees in good condition; to maintain sufficient depth of water, and to provide for lighting and policing such wharves and sheds; also with power to levy charges for the purpose of defraying their expenses in accordance with the schedule set forth in the act; and with authority to repossess themselves of the frontage farmed out under the ten-year lease.

Lake Ports.

In view of the physical conditions of Boston and her geographical situation relative to the lakes, and of her being one of the chief outlets for the products of the lake region, by reason of which during the last few years a large and increasing quantity of the merchandise transported on the lakes has

sought her port, some reference to the character and extent of that region, the traffic through the canal and at the lake ports and to the freight reductions, as exhibited in the following statistics and tables, seems pertinent.

An enormous growth of water-borne traffic in recent years has taken place on our northern lakes, where in the year 1895 there were 1,241,459 registered tons of shipping. The cargoes carried during that year equalled one-tenth of the total railroad tonnage of the whole country.

For the improvement of the harbors and channels of these great lakes since 1823, the United States government has appropriated more than $40,000,000.

About 5,500 cubic miles, or perhaps one-half of all the fresh water in rivers and lakes on the surface of the globe, are stored in the great lakes. Of some 270,000 miles of catchment basin surrounding the lakes, about 96,000 square miles are covered by the lakes themselves. Over 88,000 square miles of this water expanse form the area of the upper lakes, dammed up by Niagara to about 600 feet above tide water.

The lakes cover about one-third of their total drainage area, and are fed by only short and relatively unimportant streams. The figures contained in the following table give the dimensions, areas, depths, levels, etc., of the chain of lakes and connecting rivers: —

	Length.	Average Width.	Maximum Width.	Shore Line.	Water Area (including Islands).	Average Depth.	Maximum Depth sounded.	Surface above Tide Water.	Deepest Point above Tide Water.	Water Volume.	Land Area of Watershed.	Aggregate Water and Land Area of Watershed.
	Miles.	Miles.	Miles.	Miles.	Sq. Miles.	Feet.	Feet.	Feet.	Feet.	Cu. Miles.	Sq. Miles.	Sq. Miles.
Lake Superior,	390	70	160	1,300	31,200	475	1,008	602	—406	2,800	51,600	82,800
St. Mary's River,	53 40	2½ 2	5 4	100	200	–	53	–	–	–	800	1,000
Lake Michigan,	335	58	85	875	20,200	335	870	581	—289	1,290		
Green Bay,	115	15	21	260	1,700	95	144	581	+437	30	37,700	60,100
Mackinac Straits,	30	16	23	60	500	75	234	581	+347	7		
North Channel,	110	12	18	220	1,400	70	240	581	+341	20		
Lake Huron,	250	54	100	725	17,400	210	702	581	—121	650	31,700	55,700
Georgian Bay,	120	40	58	390	5,200	170	462	581	+119	170		
St. Clair River,	35	1	–	70	30	–	–	–	–	–	3,800	3,830
Lake St. Clair,	19	25	29	90	410	–	21	575	+554	1	3,400	3,810
Detroit River,	27	2	3½	54	60	–	–	–	–	–	1,200	1,260
Lake Erie,	250	40	58	590	10,000	70	204	573	+369	130	22,700	32,700
Niagara River,	34	1	2	70	60	–	–	–	–	–	300	360
Lake Ontario,	180	40	58	600	7,300	300	738	247	—491	410	21,600	28,900
St. Lawrence River,	760	20	95	–	–	–	–	–	–	–	–	–
Totals,	–	–	–	5,404	95,660	–	–	–	–	5,508	174,300	270,460

The table shows that, without including St. Lawrence River, the lake system has a total length of shore line of 5,400 miles, a total water area of 95,700 square miles, a total land area drained of 174,800 square miles, and, therefore, a total watershed of 270,500 square miles.

Authority says that Lake Superior is a little larger than Victoria Nyanza, and therefore the largest fresh-water lake in the world, even though its size is less than one-fifth of that of the Caspian Sea.

The greatest maritime gateway in the world is at the Detroit River, through which there passed during the year 1895 more than 50,000 vessels of all classes, having a total tonnage of more than 30,000,000. The traffic through the St. Mary's Falls Canal alone is about double the tonnage of the Suez Canal, as appears by the following table: —

St. Mary's Falls and Suez Canal Traffic.

[From Official Reports of Canal Officers.]

	St. Mary's Falls Canal.			Suez Canal.		
	1895.*	1894.	1893.	1895.	1894.	1893.
Number of vessels passed,	17,956	14,491	12,008	3,434	3,352	3,341
Tonnage, net registered,	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation,	231	234	219	365	365	365

* 1895 figures include traffic of Canadian Canal at Sault Ste. Marie, which was about one-half per cent. of the whole, but largely in American vessels.

The port of Chicago, generally termed a railroad centre, shipped by water during 1895 84,169,866 bushels of grain and 791,620 barrels of flour; while the receipts by the lake of coal, lumber and iron were immense.

The largest flour port in the world is Buffalo, which is also the second largest grain port. Her coal shipments by lake in 1895 were more than 2,500,000 tons.

The cities of Cleveland, Detroit, Duluth and a number of the smaller ports upon the lakes have to-day great fleets of steamships, — some of which are more than 400 feet in length, with a capacity of from 4,000 to 6,000 tons, — and are transporting merchandise at a cost which a few years ago would have been deemed ruinous.

*Freight Rates on Wheat (Per Bushel) by Lake from Chicago to Buffalo.**

Year.	Cents.	Year.	Cents.	Year.	Cents.
1857,	9.89	1870,	5.88	1883,	3.41
1858,	3.76	1871,	7.62	1884,	2.18
1859,	5.06	1872,	11.46	1885,	2.02
1860,	9.89	1873,	7.62	1886,	3.66
1861,	11.53	1874,	4.03	1887,	4.13
1862,	10.49	1875,	3.42	1888,	2.56
1863,	7.51	1876,	2.90	1889,	2.51
1864,	9.58	1877,	3.72	1890,	1.96
1865,	9.78	1878,	3.07	1891,	2.38
1866,	12.34	1879,	4.74	1892,	2 19
1867,	6.67	1880,	5.76	1893,	1.66
1868,	7.14	1881,	3.44	1894,	1.27
1869,	6.81	1882,	2.50	1895,	1.97

* From reports of Chicago Board of Trade and New York Produce Exchange.

Freight Charges Per Ton Per Mile on Eighteen Trunk Railroads of the United States.

Year.	Cents.	Number of Roads averaged.	Year.	Cents.	Number of Roads averaged.	Year.	Cents.	Number of Roads averaged.
1857,	2.789	6	1870,	2.513	14	1883,	1.188	17
1858,	2.956	7	1871,	1.924	11	1884,	1.087	17
1859,	2.735	8	1872,	2.101	13	1885,	1.022	17
1860,	2.593	9	1873,	1.988	14	1886,	.988	17
1861,	2.434	9	1874,	1.869	17	1887,	.971	17
1862,	2.687	9	1875,	1.686	17	1888,	.924	16
1863,	2.990	12	1876,	1.574	18	1889,	.922	16
1864,	4.501	12	1877,	1.505	18	1890,	.884	17
1865,	3.201	11	1878,	1.379	18	1891,	.868	17
1866,	3.235	12	1879,	1.244	18	1892,	.799	17
1867,	2.884	11	1880,	1.292	17	1893,	.800	17
1868,	2.741	13	1881,	1.215	17	1894,	.820	18
1869,	2.512	12	1882,	1.190	17	1895,	.810	18

The average cost for carrying goods on eighteen of the trunk line railroads of the country to-day is eight-tenths of a cent per ton per mile, while the last census of the United States shows that the average cost of moving freight upon the great lakes was one-tenth of a cent per ton per mile.

The docks, wharves and terminal facilities at all the lake ports are under either individual or corporate ownership.

By chapter 185 of the 1896 statutes of the State of New York the city of Buffalo was authorized to appropriate for public dock purposes the park lands adjacent to Lake Erie.

San Francisco.

At San Francisco the docks are public, under the control of the Board of State Harbor Commissioners, first appointed in 1863.

The Board is given possession and control of the water front of the city and county of San Francisco, with power to erect structures inside of a given line. The Board, with the mayor, may establish rates for dockage and wharfage, collecting from each as near as possible equal sums, of which the total shall not exceed a given amount. The Board is empowered to locate and construct wharves wherever it deems best, and to "repair and maintain all the wharves, piers, quays, landings and thoroughfares that the wants of commerce may require; and generally to erect all such improvements as may be necessary for the safe landing, loading, unloading and protecting of all classes of merchandise passing in and out of the city and county of San Francisco by water."

The Board is authorized to make all reasonable rules and regulations concerning the control and management of the property intrusted to it; also in relation to the mooring and anchoring of all vessels in the harbor, and the maintaining of unobstructed passageways in the same; and further to make needful rules and regulations governing the removal of vessels, to determine the time merchandise landed on any wharf shall remain, where it may be removed and the rate to be charged for the same, and to set apart and assign specified places for specific uses exclusively.

The Board is also authorized to extend any of the streets lying along the water front of the city and county to a width not exceeding 150 feet, of which the water side half may be used as a landing-place whereon tolls may be collected.

The commissioners shall not have the right to renew any lease, or to lease any premises under their control for any purpose whatever,

but they may permit any property under their control to be used by any corporation, firm, association, person or company; but in no case shall any corporation, firm, association, person or company enjoy the use of any of the property under the commissioners' charge, except such use shall be terminated as herein provided; and the said commissioners may condemn, purchase and pay a reasonable compensation for such structures as may have been erected upon said premises, which structure, in the opinion of the Board and engineer, may be useful for such commercial purposes as this article is intended to promote. No person or company shall land or remove any goods, wares or merchandise or other things upon or from any wharf, pier, quay, landing or thoroughfare situated upon the premises described in this article; nor shall any corporation, firm, association, company or person collect dockage, wharfage, cranage or toll within the boundaries of the premises described in this article, without first obtaining permission to do so from said commissioners. Any use permitted of the property of the commissioners may be terminated at any time by them, on thirty days' previous notice to the party or parties so using the same. Said board shall not lease to or permit any corporation or association or any person or persons to lay down any track or tracks for railways along any of the property described herein, or on any portion of the water front of San Francisco, under any condition whatever. Said Board may, when the wants of commerce require, lay down such number of tracks along and on any portion of said water front as may be necessary to meet such wants, and permit the use thereof to any corporation or association or any person or persons, under such rules, regulations and at such compensation as said Board may determine: *provided*, that no special privileges shall be awarded thereon to any corporation, association, person or persons; and *provided, further*, that switches from said railroad track or tracks may, with the permission of said Board and under the limitations and conditions of this act, be constructed by corporations, or any person or persons, leading to any warehouse or place of business.

Under this system, the receipts and tonnage tolls, wharfage and rents in thirty years have been $12,573,000. They have risen from $117,848 in 1863, $265,709 in 1873 and $436,030 in 1883 to $583,674 in 1893. During the same period there has been spent for construction and repairs to the wharves, sheds, bulkheads, etc., the sum of $5,021,000; also for dredging by the commissioners in the same time, $1,400,000.

It is interesting to note also the increase of the tonnage of vessels entering within that time, as, for instance, in the year 1867, 310,896 tons entered; in 1890, 1,030,538 tons; and in 1894, 1,100,333 tons.

The Board of State Harbor Commissioners, in their biennial report ending June 30, 1892, say:—

> There can be no doubt of the advantages to the State at large of the past policy of the Board regarding the absolute ownership and control of all the water front property and the structures thereon. No person nor corporation should own any structure whatever upon the State property, nor should such structure, when built by the State, be under the exclusive control of any person or corporation.

The State of Washington.

Alive to modern tendencies, the State of Washington, in her Constitution, Article XV., declares that no water areas beyond high-water marks shall be sold or relinquished by the State, "but such areas shall be forever reserved for landings, wharves and streets, and other conveniences of navigation and commerce." Subsequently a Harbor Line Commission established harbor lines in the navigable tide waters of the State adjacent to the cities, with a view to providing for docks having a length of 600 feet and an avenue fronting thereon of from 100 to 250 feet wide.

Thus the water front of all the cities in the State is to be forever preserved in uniform condition, under control of the public, in the interest of economical and convenient commercial uses, secure from the encroachment of individuals or corporations.

Public Ownership Abroad.

With reference to the extent to which the public ownership and control of docks and wharves have been adopted in foreign ports, we will first discuss those in Great Britain and afterwards those upon the continent of Europe.

In Great Britain.

At London the ownership is in private corporations, under parliamentary grants of various dates from the earliest times, and, while its dock system would be most interesting, and while as a port it represents the largest commerce of any port in the world, both in tonnage and in value, its conditions are such as to make no especial contribution to the solution of the problems under investigation.

Southampton.

At Southampton is found a remarkably fine and commodious harbor, with a system of docks ample for any demand, and also arrangements for economical and speedy handling of passengers and freight equal to any in the world. The Harbor Board, which has existed for over ninety years, controls the town quay and royal pier, and does the dredging, lighting, buoying, etc., of the harbor. Its debt for these improvements now amounts to about $1,000,000. The London & Southwestern Railway Company maintains a magnificent system of costly docks and terminals, including a dry dock 750 feet long, with a depth on the sill of 29 feet 6 inches. Passengers landing there are within two hours of London by rail, and no less than twenty different steamship companies include this port in their regular sailings to every part of the world. The policy underlying this development is squarely stated by Mr. John Dixon, dock and marine superintendent of the London & Southwestern Railway Company, in a paper read by him before the Institution of Naval Architects in July, 1896, in which he says: —

> We can give, and are providing here, in Southampton, facilities for vessels of any size and of almost any conceivable draught. . . . Time was when ships which were comparatively inexpensive had to be built to suit the ports which were comparatively costly. Now the

situation is reversed, and ports, if their owners desire to attract and secure, or even to hold, trade, must be built or adapted to suit the ships, not only of the present but of the future. This, as I interpret it, is the policy of the Southampton Harbor Board and of the London & Southwestern Railway Company, — a policy which the commissioners and directors are pursuing, in the firm belief that it will meet with its due reward at the hands of the great travelling public, and of those who control the various branches of the carrying trade of the world.

The proportion of steamers to all over-sea tonnage entering Southampton in 1893 was 96.51 per cent.; at Glasgow it was 93.74 per cent.; at the Tyne Ports, 90.14 per cent.; at Liverpool, 88.06 per cent.; at all ports in the United Kingdom it was 85.28 per cent.

Hull.

The port of Hull, on the river Humber, is an interesting study, as showing how completely a community may be placed at the mercy of a railroad corporation, and be made to suffer in order to reward the cupidity of private interests.

The original town docks were allowed to be supplanted by a dock company. The North-eastern Railway Company, getting control of the dock company, caused such high charges to be made for wharfage and carriage as to lead to the construction under an act of Parliament of the Hull & Barnsley Railroad and the Alexandra dock. Then came ruinously low charges, with a view to forcing the new company into insolvency, followed by an application to Parliament for leave to absorb it. In this brief history is shown the evil in England of allowing the docks to be controlled by private interests.*

The only places in Great Britain where the municipalities own the docks are at Bristol, at Boston in Lincolnshire, at Preston in Lancashire, and at Manchester.

---

* See for more particular information consul's report, and letter from a leading merchant of Hull, in Appendix, page 226.

Bristol.

Bristol, until quite recently, was the only port in the United Kingdom owned by a municipality. Its business is largely importing. It has facilities for distribution by three of the great systems of railways, and by canal northward to Birmingham and eastward as far as London; in addition to which it has a vast fleet of coastwise vessels, connecting it with all the principal ports of England, Ireland and Scotland. It maintains ample dock accommodation for a large commerce, and claims to afford as good facilities to traders as can be found elsewhere in Great Britain, with speedy service at nearly cost price.

The total capital invested in the Bristol dock estate amounts to about ten and a half million dollars. The affairs of the dock estate are managed by a committee of nineteen members of the town council, appointed annually, and by an extremely competent, experienced and cultivated secretary and general manager, whose information must be as invaluable as his administration is complete. His opinion, formed upon such information concerning the conditions at Boston as the visiting committee of this Board imparted to him, was strongly in favor of the adoption here of a system of public ownership of docks and wharves.*

Boston.

At Boston a dock was built at considerable cost to accommodate water carriage to London, to induce the lowering of railway freight charges. In this object it was quite successful; and it also brought about the additional and unexpected benefit of building up the fisheries interests, so that now the annual tax on the people for its support is rapidly diminishing. It is generally thought by the leading merchants at Boston that the incidental benefits more than offset the direct charges.

* For further information as to Bristol reference is made to the Appendix, p. 177.

Preston.

Preston is a town in Lancashire on the river Ribble, with 107,000 inhabitants.

The citizens, feeling aggrieved at the high rates charged for railroad service, and unable to obtain a reduction thereof, concluded that they would have water communication, and thereby obtain competition with the railroads. Accordingly they procured an act of Parliament, excavated a dock 40 acres in area, and deepened and widened the river, at a cost of over $5,000,000; and, while it is claimed that the investment is as yet not earning interest, it is believed by the inhabitants that the indirect benefits of lessening the expense of transporting bulky materials and the cost of the necessities of life have been sufficiently remunerative to the community to warrant the increase in the rate of taxation. A lowering of the railroad tariffs has been the result of this public enterprise.

Manchester.

Manchester, until quite recently, was dependent upon Liverpool for its port facilities. It is connected by several railroads, over which almost all the business between the two places was done.

The people of Manchester, in 1882, dissatisfied with the rates they were obliged to pay for the commodities of life and for use in their great manufactories, determined to provide a waterway which should make Manchester an independent port of shipment and discharge, and thus free themselves from the tribute they were obliged to pay to Liverpool. Obtaining an act of Parliament, they organized the Manchester Ship Canal Company, and have built a canal 35½ miles long, from Manchester to Eastham, where it terminates in the Mersey 6 miles above Liverpool.

The canal has a bottom width of 120 feet at a full depth

of 26 feet, and it is claimed that this affords a waterway for ocean steamships of 5,000 tons. At the Manchester end there are ample docks, equipped with transit sheds, hydraulic and steam cranes and other appliances for giving quick despatch in loading and discharging. They are connected directly with all the railway systems of the country, and are also in direct communication with the barge canals of the district; and the company receives stores and distributes all descriptions of traffic.

The cost of this enterprise thus far has reached the enormous sum of $75,000,000, and that is more than double the original estimates.

As the undertaking progressed, the city of Manchester came forward with assistance, and enabled the company to complete its work. So soon as the canal was opened for traffic, the people of Manchester began to realize the beneficial effect of the undertaking in the reduction of the cost of many of the articles of consumption, and in the lowering of competing railroad rates; and it is claimed that the direct benefit to the district during the two and a half years of working by reason of the reduction in railway rates and port charges has been not less than $10,000,000. In the first seven months of 1894 the sea-going traffic was 216,000 tons, in the same period of 1895 it was 582,000 tons, and in 1896 it reached 822,000 tons.

Notwithstanding these facts, the canal cannot be considered a financial success. The city of Manchester required a representation on the Board of Directors upon making its first loan; and when its last loan was advanced, it required that its representation should control the Board. The loss of interest on these loans is felt in the rate of taxation; and this has led to a discussion of plans for a reorganization of the finances of the canal company, among which the plan of administration under the form of a public trust has been advocated.

Harbor Trusts.

The English Dock and Harbor-board Trust, formed for the government of ports, is an evolution from the investiture of similar powers in the mayor and aldermen, burgesses or council of boroughs or towns adjacent to or included in the port under earlier acts of Parliament.

The Mersey Docks and Harbor Trust at Liverpool, the Tyne Improvement Commission at Newcastle, the Clyde Harbor Trust at Glasgow, the Dublin Harbor Trust, the Belfast Harbor Trust, the Aberdeen Harbor Trust, the Swansea Harbor Trust, all in Great Britain and Ireland; the Auckland Harbor Trust, in New Zealand; the Melbourne Harbor Trust, in Australia; and the Bombay Harbor Trust, in British India, — are all illustrations of the method adopted as the best form of the management and control of commercial interests where English ideas prevail.

The general scheme of the English Harbor Trust is the incorporation of commissioners with perpetual succession and a common seal, under a title, of which the foregoing are examples, intrusting them with power to hold and mortgage real estate, and with power necessary to conserve the harbor, manage and improve the port, and the powers incident thereto.

These boards, on which it is a highly esteemed honor to be asked to serve, as a rule consist of a large number of members, varying from thirteen at Bombay to twenty-eight at Liverpool. They are intended to represent in varying numbers the government, the municipality, the Board of Trade or Chamber of Commerce, or other body interested in shipping, ship owners locally registered, merchants and traders paying wharfage rates, and tax payers. All but the government representatives are elected by their respective constituencies, to serve for a limited term, without pay beyond a fee for attendance at meetings.

The general objects of this incorporation are three: 1. The conservation of the harbor and the waterways, and their improvement. 2. The improvement of the accommodations and facilities required for the commerce of the port, and its future needs. 3. A study of the economic advantages of the locality, and of the best methods for ensuring the handling of cargoes and the despatch of vessels, with the least charges for the benefits derived.

Another important function of these commissions is the financing of the improvements undertaken. This is customarily done by the issue of bonds, sometimes guaranteed by the municipality, secured by the annual port charges and dock rates authorized by Parliament. Its loans, as a rule, bear a low rate of interest, owing to the undoubted character of the security they represent.

While this form of management is more or less familiar, it is interesting to note the spirit and courage with which the improvement of these great ports has been undertaken, and the vast sums of money which have been freely expended, and the returns which have been the direct results of far-sighted, clear-headed policy.

Liverpool.

At Liverpool, with a population of 600,000, — where the mean rise and fall of tides is about 26 feet, with a length of dock-frontage on the river of 7¼ miles, and an enclosed dock area of 546 acres, having a wharf frontage of 35 miles, — there has been expended by the Mersey Docks and Harbor Board in gross in acquiring their present property, in round numbers, about $200,000,000.* Of this sum, $38,000,000 was the debt assumed when the property was taken over from the Liverpool Dock Trustees in 1857. Since that date £13,916,685 2*s.* 6*d*, or about $69,500,000, has been raised

* See Appendix, p. 247.

and expended from loans authorized at various times by Parliament in addition to expenditures out of receipts. The amount of bonds and annuities at present outstanding is about $89,000,000.

During the last five years 10,280,800 tons have been removed from the sand bars at the mouth of the Mersey, in order that ocean steamers might be enabled to navigate the river at all stages of the tide.

Liverpool is especially interesting as a market of cotton, grain and cattle, and it is noteworthy that for the year ending June 30, 1895, more grain was received from Boston, U. S. A., than from any other port in the world, and that over one-third of all the cattle received at Liverpool was shipped from Boston.*

Tables of the rates and dues payable in respect of ships and goods under various acts of parliament and resolutions of the Mersey Docks and Harbor Board at Liverpool are published in a book of sixty-eight pages. It contains full schedules of all the rates payable on vessels and goods, whether as dock rates or town dues.

Dock tonnage rates are charged on all vessels entering or leaving the docks, according to the tonnage burden thereof, at rates named in the schedule and varying according to whether they are in the foreign or coastwise trade, ranging from $2\frac{3}{4}d.$ to $1s.$ $5d.$ per ton, with differential rates of about one-half when arriving in ballast or discharging at the lairage.

There is in addition a harbor rate on vessels, varying from $\frac{3}{8}d.$ to $2d.$ per ton, according to the class of the voyage, of which there are seven classes.

In cases where vessels discharge at a wharf or quay from the river and do not enter the docks, they are not charged so much, rates in that case varying from $\frac{5}{8}d.$ to $4\frac{1}{4}d.$ per ton, according to the class of voyage.

* The lairage at Birkenhead, the most complete and perfect of its kind in the world, is capable of handling 7,000 horned cattle, besides other animals.

In addition to the tonnage dues on vessels there are dock rates and town dues on goods, the enumeration of which occupies thirty pages, on which rates are levied per package, per hundred weight and per ton, ranging from 3½*d.* per ton on coal to 5*s.* per ton on various high-cost manufactured articles, with differential rates on certain bulky goods, like ores and lumber, and on goods in transit from foreign ports, those arriving coastwise and afterwards exported, and a few others.

The foregoing is a sample of the tolls and charges customarily levied in foreign ports, subject to local variations in amounts. Aside from these, at some ports other charges, such as anchorage, lighthouse and harbor dues, are levied, all of which appear not only complicated but burdensome, as compared with the few and simple charges this side the Atlantic.

Newcastle.

At Newcastle-upon-Tyne, about fifteen miles above the mouth of the river, one hundred years ago there was no foreign commerce. The Tyne was a small, narrow, inland stream, with a shallow bar at its mouth.

After an expenditure of about $27,000,000, there now exists a deep river, down which are floated completely equipped armor-clad vessels, built at the steel works of Sir William Armstrong, two miles above the city, where 16,000 working people are employed. The river banks for 15 miles down to the sea on both sides are hives of industry, where machine shops, ship yards, foundries, loading and discharging berths in close contact, all lie adjacent to one another. One considerable stretch is occupied by the appliances for shipping coal, of which over 12,000,000 tons annually are exported.

At the mouth of the river, where once a shallow bar made navigation dangerous, are now two large jetties, one 3,059 feet and the other 5,317 feet in length, with an opening of

1,300 feet between, and a light at the end of each, making a passageway that guides the direction of the ebb tide, thus preventing the formation of another bar, and affording a secure basin for safe shelter within.

Glasgow.

At Glasgow, 18 miles up the Clyde, is found another illustration of enterprise, industry and foresight.

Not many years ago one might cross the Clyde at old Glasgow on stepping-stones at low tide; and when first the deepening began, it was by breaking up the bottom with a plough. Now vessels may sail up to the city at mean high tide in 28 feet of water.

The river is narrow, and for a distance of about 2½ miles, where the docks are located, it has a width of from 400 to 500 feet. The water area is only about 180 acres. The total length of quayage is 14,793 yards, of which half is allotted to various lines of steamers trading with the different ports of the world. The rest is available, and is used for general purposes of trade. The docks and basins along the sides of the river have been excavated from solid land. The Queen's Dock was completed in 1880, after eight years of work, at a total cost of $7,000,000. It is calculated to accommodate 100,000 tons of shipping.

Among their graving or dry docks, of which there are several, there is one 900 feet long, 85 feet wide at the entrance and 26 feet over the sill at high water. Most of the harbor quays are built of solid masonry, and are well equipped with modern appliances.

The total gross expenditure on account of improvements on the Clyde from 1770 to June 30, 1895, has been $73,750,000. The Clyde Trust, under various acts of Parliament since 1858, has been authorized to borrow nearly $31,250,000. Its total debt on June 30, 1895, was about $27,000,000. It is said that the success of this port in competition with other ports is largely

due to the wise management and energy of the Clyde Trust, and to the growth and business of Glasgow.

It is an adage that "Glasgow made the Clyde and the Clyde made Glasgow." Had the inhabitants waited for the time when commerce should demand the development of their river, such vessels as the "Lucania" and the "Campania" would never have been built at her ship yards and floated down the Clyde.

Auckland.

Auckland Harbor, New Zealand, is readily accessible at all times of tide and weather, having ample deep water at the entrance and inside. Its Harbor Board has large endowments from the Crown, owning all the foreshore of the harbor. About one-third of the revenue received by the Harbor Board is gained from rents of leasehold property. The Board has spent on docks and improvements, since 1885, the sum of $3,300,000. Their total revenue for the year 1894 was about $170,000.

The wharves at present constructed in the harbor give 14,000 linear feet of berthage, with a depth of 25 feet at ordinary spring tides. The railroads are connected with the wharves, and are the property of the government.

The population of Auckland is about 50,000. Her total tonnage in 1894 was 971,292 tons.

Bombay.

The population of the city of Bombay is 860,000. It is said to possess the best harbor on the coast of Hindoostan, and is conveniently located for the traffic between India and Europe.

The water front available for shipping purposes is owned by the Bombay Port Trust, which was organized in 1873. Beside the systematic manner in which it has laid out other extensive improvements, it has built two wet docks of a combined area of 55 acres, 2½ miles of quayage and a dry

dock. The total expenditure on capital account since 1873 has amounted to about $11,400,000, during which time its steam foreign and coasting tonnage has increased from 327,-194 to 2,068,178 registered tons. Two systems of railway connect Bombay with the interior of India.

This form of property control adopted by the English has the advantage of securing a watchful oversight by a competent board of the needs of a growing port. Plans are matured far in advance of execution, and improvements are made in a systematic manner upon lines of development covering projects worked out from beginning to end. Few errors are made, and but little money is wasted. The money required for extensions is raised at the lowest rates, the income-earning property itself becoming the security for the debt. The tolls and charges are measured by the requirements for interest, sinking fund, annual repairs, maintenance and salaries. Thus the port, while furnishing every modern convenience and facility, is prepared to compete with other ports in points of economy and rapidity of handling. It has no dividends to earn, as in case of individual or corporate ownership, nor is it called upon to increase the income of a municipality, as has been the case in some instances.*

On the Continent.

Upon the continent of Europe public ownership and control of docks and harbors is universal, with the exception of Copenhagen, where the free port is incorporated, and at Marseilles, where the ownership of the docks is both public and private.

* To cite an illustration: At Newcastle-upon-Tyne, between 1809 and 1850, when a change took place, some $2,750,000 of the river revenue was spent on lighting, paving and sewering the city.

Marseilles.

Marseilles is fortunately located for a great commercial port. There is ample depth of water and an easy entrance to the harbor. A breakwater, 3,595 metres (over 2 miles) long, a magnificent piece of masonry, protects the basins.

The private company has 3 docks, with an area of 145 acres and 26,360 feet of quayage. The public docks contain 195 acres, with 23,115 feet of quayage.

Marseilles is the only port in Europe known to us where the two forms of ownership, public and private, have come into active competition with each other. The effect of this competition is described in the consular report,* as follows:—

> In 1872, when the business of this port was practically in the hands and under the control of the private company of the docks and entrepots, the commerce had reached such proportions that the docks and wharves were altogether insufficient for the requirements of trade, and reclamations for delay and damage became numerous and frequent, and were generally unheeded. The private company, intrenched in its monopoly, continued to impose its full tariffs, and refused any enlargement of its facilities. To relieve this congested and paralyzing condition, new docks were authorized by national legislation in 1874, were begun in 1875 and completed in part in 1881. Public sentiment demanded in strong and vigorous tones the construction of the new docks, and that they should be owned and controlled by the public authorities as a security and protection for all time against the monopoly and exactions of private companies. Free labor and free quays was the battlecry of the agitation. Litigation arose; the private company of the docks and entrepots claimed an exclusive concession from the State. The courts decided against the contention of the private company, and the new national docks were undertaken, completed and are now controlled by the Marseilles Chamber of Commerce. The competition between the public and private companies has been most beneficial. It has stimulated improvements and multiplied facilities, while the port charges have decreased more than eight per cent. in five years.

There has been expended in the improvements in seventy-five years $23,780,000, of which $6,780,000 were spent by

* See Appendix, p, 251, reply to Query No. 7.

private enterprise and $17,000,000 by the public authorities. A considerable part of the latter sum was paid for the construction of the breakwater. The combination has worked satisfactorily, having resulted in lower charges to the shipping interest and the merchants, and in the period since the new docks were opened the tonnage has nearly doubled.

Marseilles is to be credited with a very complete and well-ordered system of classifying the arriving and departing merchandise, and with ample space for handling, thereby promoting economy with respect to both time and money.

The four continental ports of Havre, at the mouth of the river Seine, of Antwerp, fifty-nine miles up the Scheldt, of Hamburg, seventy miles up the Elbe, and of Rotterdam on the new Maas, being the main outlet of the Rhine, eighteen miles from its mouth, are all great cities and commercial entrepots, whose present growth and importance have been largely achieved within the century. They are all connected by systems of waterways with the far interior of Europe, and are great distributing centres, where merchandise changes bulk in transportation to ultimate destination, and all are natural terminals, where barge or river navigation ends and ocean carriage begins.

At each city is to be found magnificent and costly systems of docks, piers, anchorages and waterways, under public ownership and control, possessing every facility for carrying on an immense trade by means of commodious and convenient warehouses, with modern appliances, operated by steam, water or electricity; and all are designed to promote economy and speed in handling at low, uniform and unvarying rates of charge.

Rotterdam.

Rotterdam, with a population of 200,000, owes her success to the opening in 1872 of a new mouth to the river Maas across the Hook-of-Holland, at an expenditure of $17,000,000, in which 52,000,000 cubic yards of earth were removed; and to the establishing of new quays, basins, warehouses, etc., at a cost of $9,000,000, during the past twenty years. She now has a water area in her basins of 272 acres and a quayage 14 miles long. The total sea-going tonnage entering the port of Rotterdam during the year 1895 was over 4,000,000, not including the tonnage of 2,300 fishing smacks which arrived at the port. The wharves, quays and docks, as well as the water front, are owned and controlled by the municipality, except the east quay of the Spoorweg Haven, which is owned by the State Railway, and some small floating docks in private ownership.

Committees of the city council control the harbor, docks, quays and warehouses, which are all connected by a railway built by the city but operated by the State Railway; and that again allows other railways equal use to points within prescribed limits, at which the rates charged on goods are the same as at the main station of the city, — thus obviating local charges and securing direct trans-shipment of goods without extra charge to shippers.

Hamburg.

Hamburg, with a population of 520,000, since 1883 has expended the vast sum of $39,400,000, a large portion of which was devoted to improving the navigability of the river by deepening and straightening its channels. The water basins for the uses of commerce, mostly dug out of the solid earth, cover an area of 741 acres, within which the length of quayage is 9 miles. Her wharf and warehouse accommodations are the most ample, convenient and sightly in Europe

and her eight graving or dry docks, besides other floating docks, provide for the repair of her fleets.

In 1893 there arrived at this port 8,792 sea-going vessels, of 5,866,000 registered tonnage; in 1895 there arrived 9,443 sea-going vessels, of a registered tonnage of 6,255,718.

Hamburg owns and controls her quays, basins and warehouses, and manages them by means of a quay department. They are all open to the use of the public, except the Peterson quay, which is leased by the Hamburg-American Steamship Company, and the Petroleum harbor, which is leased by the Standard oil interest. The water basins are open; the quays are of masonry, and are provided with railroads, streets and portable steam cranes, of which the largest lifts 500 tons. In the free territory the Hamburg Free Port Warehouse Company have leased some land and erected warehouses. The State Railroad runs on to the quays and into many of the warehouses.

The merchants of Hamburg are among the most enterprising and far-sighted in Europe, and have great confidence in their system of ownership and control of harbor and quay development, as well as in the maintenance of the free port.

The following statement shows the number of vessels and the tonnage engaged in the foreign trade entered at Hamburg during a period of ten years: —

Year.	Number of Vessels entered.	Foreign Tonnage entered.
1886,	6,913	3,791,992
1887,	7,308	3,920,234
1888,	7,524	4,355,511
1889,	8,079	4,808,421
1890,	8,576	5,202,825
1891,	8,673	5,762,369
1892,	8,569	5,638,433
1893,	8,792	5,886,378
1894,	9,165	6,228,821
1895,	9,443	6,255,718

Copenhagen.

Copenhagen lies on the sound at the entrance of the Baltic Sea, with a population of 330,000. The ownership of wharves and quays is partly public and partly private, and the arrangement is said to work harmoniously. The warehouses are private property. The use of the wharves and quays is regulated by a Harbor Council, a composite body based on the English model.

Fears that the Kiel Canal would interfere with the business of Copenhagen led to the establishment of the free port, whose objects are said to be: first, to facilitate and develop the trade at Copenhagen by reducing to a minimum loading and discharging expenses, and by removing those trammels to trade connected with the interference of customs officers; second, to enable the manufacturers of Copenhagen to compete in foreign markets by affording a port for the erection of works for manufacturing within the limits of a free port.

The free port is perhaps the most scientifically arranged port of its size in the world. Its entire system of machinery and appliances is operated by electricity, which is generated at a plant on the premises. The labor of discharging grain cargoes is reduced to a minimum by the application of machinery, belting being so arranged as to carry grain from the ship's side to the bins in the warehouse. Its electric cranes are worked noiselessly, with the precision and expedition of the most perfect hydraulic system. It deserves special mention on account of being a model free port, and as having a private and public dock system working satisfactorily side by side.

Havre.

Havre has a population of 120,000, and maintains a splendid system of docks and warehouses with all the modern appliances for the speedy handling of cargoes. It is

remarkable as having been artificially constructed, without natural advantages except that of location.

The eminent engineer, Mr. H. Vétillart, in a paper read before the International Maritime Congress, London, July, 1893, says: —

> But, while these advantages are in its favor as a sea-port, there are certain engineering difficulties in the way of carrying out important dock work, — such as the foundation of quay walls and entrances on recent alluvial deposits, not to mention the construction of heavy masonry in a district where the geological formation can supply none of the necessary material, such as stone, lime, cement and sand. Added to this, also, there is the difficulty of maintaining a sufficient depth of water in basins left open to the travel of shingle and to the mud-laden water of the bay, as well as that of securing a fixed deep-water channel through the shingle beach and submerged banks of the river estuary.

Again, speaking of the cost of construction and improvement, he says: —

> The total public expenditure upon the construction and improvement of the port of Havre was estimated, at the end of 1892, at 140,000,000 francs ($28,000,000), or, including the construction of the Tancarville Canal, at 165,000,000 francs ($33,000,000). Of this sum the Chamber of Commerce, the town of Havre and the Département de la Seine Inferieure have found nearly 14,000,000 francs ($2,800,000). The figures cover the cost of excavations and embankments, the construction of dock basins, quays, entrances, dry docks and their contingent works. The expenditure borne by the Chamber of Commerce on sheds, cranes and winches amounts to over 4,000,000 francs ($800,000).

Notwithstanding this vast expenditure, improvements in the harbor and additional docks and basins are now projected at a cost of 27,000,000 francs ($5,400,000), of which half will be borne by the government and half by the city and the department of the Seine in equal moieties.

The government owns, but the city controls and manages, the dock system, making the rules and regulations therefor.

Antwerp.

Antwerp is the chief port of Belguim, and has a population of 300,000. The river bank has been built up with masonry into a quay; and the docks, dug out of the solid earth, give an area of about 2,000,000 feet.

The equipment for economically handling cargoes is a matter of pride at Antwerp. There has been expended in improvements at the port about $25,000,000. The total tonnage has been gradually increasing since 1885, when it was 3,492,934, to 1894, in which year it rose to 5,008,983 tons.

The great improvements which have taken place in Antwerp, in changing the boulevards on the river front to quays for vessels (in pursuance of a policy the contrary of that which has prevailed at Boston), and by increasing the number and character of its docks, have tended greatly to enlarge the business of the port.

At the same time it must be noted that the increase in size of the steamers of the present day has been so rapid as to have outgrown the river accommodations; and, notwithstanding these great improvements, competition has been so severe of late as to compel a reduction in wharf charges of between 40 and 50 per cent., and at the same time to suggest to the Kingdom of Belgium the desirableness, in the interest of retaining its proportion of transatlantic commerce, of building a new port upon the sea-coast at Heyst, whereby passengers and freight may be landed without the delay incident to ascending the river sixty miles to Antwerp.

The eminent chief engineer of public works, Mr. G. Royers, in discussing the advantages of public ownership, says: —

First. — The advantage of public ownership in docks, basins, wharves, etc., may be found (*a*) in the minimum rate of interest on the capital necessarily engaged; (*b*) in the possibility of dimin-

ishing the amount of direct receipts, with a view to struggle against competition, the compensation being found in the enhanced commercial prosperity thus created; (*c*) to the preference which a public administration can and should give, *cæteris paribus*, to a large traffic, whereas a private company from its particular point of view would prefer, and with reason, a less traffic, but with more remunerative rates; and, (*d*) lastly, the impartiality and kindly protection which should inspire a properly organized public body.

Second. — Owners of private property, or persons to whom concessions have been made, have not been able, at least as far as I know, to defend any opposite theory.

Third. — An important element of prosperity is ever found in being able to reduce port charges, as this leads to more successful competition. Reductions, such as have already been made and such as will be made hereafter, would have been impossible with individuals or with companies, since not only is the rate of interest on loans very low but there is no real necessity to cover it by the amount of actual receipts.

Fourth. — The development of the port of Antwerp is solely due to the intervention of the public authorities (the State and the town); and one may fairly assume that no private company would continue to exist under the severe competition actually existing, nor could it have rescued the port from the lifelessness into which in 1830 it had fallen. One may be permitted to think, however, that such a result would not have been wholly impossible if all other European ports, in competition with Antwerp, had also been administered by private enterprise.

Montreal.

Montreal, on the river St. Lawrence, is really a summer port, being closed to shipping by the river ice for five months of the year. Large harbor improvements and excavations in the river are continuously going on, with a view to making safe navigation for the largest ocean steamships.

Harbor commissioners were appointed as early as 1830, and under their powers the first regular system of wharves was undertaken. The Board is modelled on the English Harbor Trust, and has control of all the wharves, the same being public property. It also possesses all pilotage authority 160 miles down the river to Quebec.

Tonnage dues on vessels have been abolished since 1888.

There is a fine system of canals, built by the government at great cost, connecting Montreal with the interior and the great lakes. Since 1867 large sums of money have been spent in harbor and river improvements, amounting to over $2,850,000 (coincident almost with the sum spent by the government of the United States in improving the harbor of Boston the past seventy years, or since 1825, the total of which amounts to $2,563,657). These wise expenditures have resulted in a great increase in shipping and exports, which between the years 1885 and 1893 rose from 683,854 to 1,151,777 in tonnage of ocean vessels, and from $25,274,898 to $48,205,531 in value of merchandise exported. A correspondent writes that, in a debate by the Montreal city council, at which resolutions urging the government to hasten contemplated improvements were adopted, "it was evident that the mercantile community is animated by a strong desire that Montreal shall be one of the very finest harbors on the North American continent."

Population, Amount of Registered Foreign Tonnage entered at Various Foreign Ports and Amount of Money expended on Harbors, Docks, etc., at the Same.

[All expressed in round thousands.]

	Population.	Foreign Tonnage entered.*	Money expended on Harbors, Docks, etc.
London,	4,212,000	8,302,000	Unobtainable
Bombay,	860,000	1,355,000	$11,400,000
Glasgow,	678,000	1,088,000	74,000,000
Hamburg,	520,000	6,229,000	39,420,000
Liverpool,	600,000	5,492,000	200,000,000
Melbourne,	491,000	1,922,000	13,800,000
Marseilles,	404,000	3,448,000	17,000,000† / 6,780,000‡
Antwerp,	303,000	5,008,000	25,000,000
Bristol,	300,000	774,000	10,500,000
Sydney,	280,000	1,960,000	Unobtainable
Montreal,	220,000	721,000	3,975,000
Genoa,	205,000	2,528,000	8,500,000
Rotterdam,	202,000	4,143,000	25,985,000
Tyne Ports (Newcastle and Shields),	300,000	3,471,000	26,500,000
Havre,	120,000	2,271,000	28,000,000
Auckland,	50,000	263,000	3,300,000

* Figures for year 1894, with exceptions of Bombay and Montreal, 1895, and Melbourne, 1893.
† Public. ‡ Private.

Concerning the Reasons for Public Ownership.

A harbor is essentially public. The right to embark and disembark again to the land should be as free as the people whose property it is.

It is said by Lord Justice Hale, *de Portibus Maris:* "When a port is fixed, both natives and foreigners are interested by reason of common commerce, trade and intercourse; and they ought to be preserved from impediments and nuisances that may hinder or annoy the access or abode or recess of ships and vessels and seamen, or the unlading or relading of goods."

It would not be profitable to go into the history of foreign ports to trace their origin, whether from royal edict, parliamentary grant or a free town's decree.

In a democratic republic like the United States the harbors are held by the State government as a sacred public trust, which even the Legislatures have no right permanently to impair.

In Martin *v.* Waddell, 16 Pet. Rep. 410, the United States supreme court says: —

> When the Revolution took place, the people of each State became themselves sovereign, and in that character held the absolute right to all their navigable waters, and the soil under them, for their own common use, subject only to the rights surrendered by the Constitution.

In the well-known Massachusetts case of the Commonwealth *v.* Alger, in the opinion of the court Chief-Justice Shaw uses the following language: —

> Supposing, then, that the Commonwealth does hold all the power which exists anywhere to regulate and dispose of the sea-shores and tide waters of all lands under them and all public rights connected with them; whether this power be traced to the right of property or the right of sovereignty as its principal source, it must be regarded as held in trust for the best interest of the public, for commerce and navigation, and for all the legitimate and appropriate uses to which it may be made subservient.

This is not a new doctrine, but it is occasionally well to restate it; and it is found reaffirmed by the supreme court of the United States in what is known as the "Lake Front" case of Chicago, where, in delivering the opinion of the court, Mr. Justice Brewer says: —

> The position advanced by the railroad company in support of its claim to the ownership of the submerged lands and the right to the erection of wharves, piers and docks at its pleasure, or for its business in the harbor of Chicago, would place every harbor in the country at the mercy of a majority of the Legislature of the State in which the harbor is situated. We cannot, it is true, cite any authority where a grant of this kind has been held invalid, for we believe that no instances exist where the harbor of a great city and its commerce have been allowed to pass into the control of any private corporation. But the decisions are numerous which declare that such property is held by the State, by virtue of its sovereignty, in trust for the public. The ownership of the navigable waters of the harbor and the lands under them is a subject of public concern to the whole people of the State. The trust with which they are held, therefore, is governmental, and cannot be alienated except in those instances mentioned of parcels used in the improvement of the interest thus held, or when parcels can be disposed of without detriment to the public interest in the lands and waters remaining. This follows necessarily from the public character of the property, being held by the whole people for purposes in which the whole people are interested.

The opinions here stated are cited as an indication of proper grounds upon which may be based a proposition on behalf of public ownership and control of the wharves of a great port; and they seem to be laid in the foundations of natural right, of public convenience and in principles of justice.

Wharves are the means whereby the public on land can transfer themselves and their goods to the water, and *vice versa*, — just as turnpikes, streets and highways are the means for enabling free and easy transportation wholly on the land. No impediments or barriers beyond the limit of public control should be permitted to obstruct freedom of

communication between land and water. The rivers and seas are the highways of water-borne freight and passengers, and the right of landing and embarking ought to suffer no more or greater legal obstruction than the right of traversing the highway on sea or land. It becomes the duty of the public, then, to preserve that right for present and future use.

In order to reap the fullest enjoyment of this right, facilities and conveniences must be supplied for the required use. These necessarily become a charge, owing to the cost of construction and maintenance, in consequence of which a toll must be paid by the users. This toll is an unavoidable obstruction to free transference over a wharf which is built for increased accommodation and for lessening the cost of handling. But it is obvious that the smaller the toll the less will be the obstruction.

Aside, however, from questions of natural right and justice, there are other business and practical considerations which appear as satisfactory reasons as given in the communications of our consuls from different ports. The following are condensed from the consular reports printed in the Appendix: —

AUCKLAND. — Public ownership manages matters solely for the benefit of the public. It does not seek to make profit. All accumulations of money from every source are returned to those who paid it, in the shape of increased accommodation and appliances for the benefit of trade. Under public ownership charges are levied equally upon all classes of goods, and equally upon all individuals. Favoring of particular lines of trade is avoided. Public ownership is a great boon to the community.

BELFAST. — Moderate dues are imposed under public ownership, and facilities are provided with a view to development of trade. Private ownership looks for the greatest return it can get.

COPENHAGEN. — Charges at public wharves are generally less than at private wharves.

GLASGOW. — Public ownership of docks gives cheaper rates and dues, and better facilities for the purposes of commerce.

HAMBURG. — Public ownership gives lower profit to the owners than private parties would be contented with.

LIVERPOOL. — The commercial advantages of public control would be that the docks and harbor are worked entirely for the benefit of the traders and those using and frequenting the port; and that all surplus revenue, after payment of interest on borrowed capital, should either go towards reducing the debt, or capital of the company, or should be expended in extension of the dock system, or in providing new facilities and improving those already existing at the port.

MELBOURNE. — Under public ownership steps can be taken to meet the requirements of the port in a better manner than by private ownership. It supplies the necessary accommodation for shipping at a more reasonable charge.

NEWCASTLE-UPON-TYNE. — Public ownership has no motive other than to extend and benefit the trade of the port.

QUEBEC. — Except for the public ownership, none of the improvements now existing would have been made.

ROTTERDAM. — "A great and successful sea-port can be built up only by united effort. The docks, quays and necessary mechanical appliances are part and parcel of the port and harbor. How the harmony, order and method so essential to the development and successful administration of vast and varied interests can be secured, unless the sea-port and its harbor service in their entirety be subjected to the direction of one central controlling power, is, indeed, difficult to understand."

In addition to the foregoing, from the testimony which this commission has been able to gather, both through the agency of

its committee who went abroad in the summer of 1895, when they conferred with the leading merchants and officials of seventeen foreign ports (and elsewhere), and from correspondence and personal interviews, held with the representatives of various ports in this country, this commission has become satisfied that the reasons for public ownership and control reside, as hereinbefore stated, not only in those natural rights which underlie the exercise of true popular liberty, but in that business sagacity and far-sighted prudence which is able to apply the principles of economy, to realize that delay means cost and despatch means profit, and that uniform and stable charges attract as fixed factors in a business calculation, and also in the understanding that all these elements are most completely supplied through public ownership and control.

The competitive ports of Europe have been created and are maintained apparently regardless of cost; and yet the lowering of charges and the building of new ports at the seacoast as adjuncts to the up-river cities show how sharp competition has become. Cuxhaven, Bremerhaven, Heyst (now building), are made necessary because of the increased size of the modern transatlantic liner, and because the modern traveller wishes to be landed without personal inconvenience, and as soon as possible after the shore line of his destination is in sight. The landing accommodations given at Southampton and Liverpool have raised the standard of requirements, to which other competitive ports are obliged to respond. One cannot fail to notice that, in every case reported, an outlay for increased accommodation has been followed by increase of business.

Thus far your commissioners have endeavored to indicate the line of their investigation, and to epitomize such evidence as they have collected bearing on the policy of public ownership and control, and on its results both at home and abroad, and also to show the general trend of public sentiment at those places where that policy has been determined on and is having or about to have its trial.

II.

"If the System of Public Ownership of Docks and Wharves is Elsewhere of General Public Advantage, can Such a System be established in Boston with Advantage to the Public Interests, in View of the Existing Ownership of Docks and Wharves in that City, and the Conditions under Which the Commerce of the Port is carried on?"

Assuming that the policy of public ownership has been shown to be of general public advantage elsewhere, the next question confronting us is upon the adaptability of this policy to existing conditions at Boston.

Water Front.

What is the extent of our water front? What are the conditions under which the commerce of this port is carried on? What were the conditions of its growth, and how is it occupied?

The following is the shore mileage of our metropolis, without reference to its present use or occupation: —

Below Bridges.

	Miles.
Water face of the city proper,	1⅝
Charlestown frontage (exclusive of Navy Yard),	1⅛
Portion of Chelsea frontage,	¾
East Boston water face (exclusive of unimproved flats),	2⅜
South Boston flats (to reserved channel),	1¾
	7⅝

Above Bridges.

	Miles.
Chelsea Creek, from First Bridge to Sales Creek,	3½
Mystic River, from Chelsea Bridge to Medford line,	6
South Channel,	1
Charles River to the United States Arsenal,	14
Miller's River,	1
Fort Point Channel and South Bay,	4
Neponset River, from Commercial Point to Milton Lower Mills,	7½
	37
Total water face above and below bridges,	44⅝

Wharves serve the purpose of enabling passengers and goods to be conveniently transferred between land and water. To a large extent they take the place of lighters, and afford a comparatively safe and convenient structure, whereat vessels may discharge and receive freight and passengers. They have superseded the use of the natural banks and rivers and estuaries in the interests of convenience and economy. At the same time they have imposed a limit on the natural rights of the public by the erection in tide waters of lawful obstructions to free landing and embarking which cannot be availed of without the payment of toll.

In early colonial times individuals were granted the right to construct and maintain wharves, with the privilege of charging and collecting tolls for their use until such time as they might be reimbursed for the cost thereof. This operated as a sufficient inducement, and many wharves were built as a direct result of it.

In September, 1641, at a meeting of the selectmen of Boston, Valentine Hill and his associates were allowed to build a dock and to take tonnage on such vessels and wharfage on such goods as might arrive during the period of eighty years, at the end of which time the dock was to become town property. It was located where Dock Square now is, was one of the best docks in the world, there being nothing like it in England, and for a long time continued to be of great use to the community. It marked the beginning of the great shipping business which made Boston's fame world wide.

In September, 1673, an agreement was entered into between the selectmen and several inhabitants of Boston whereby they were privileged to build a wall, or wharf, on the flats before the town from the North Battery to the South Battery, for the securing of the said town from fire-ships in case of the approach of an enemy; and for so doing they were entitled to receive, possess and enjoy all those flats between the wall and the town two hundred feet back towards the town, proportionally in

width to the number of feet of wall each should build, whereon they might build wharves and warehouses, with the right to collect dockage from such vessels as should harbor within the cove.

From that time grants of the right to build docks and wharves and to take tolls are of frequent occurrence in the town records, and later in legislative enactments. They constitute the authority under which were built the wharves and docks along our water front, the growth of which has become a matter of historic, as well as practical, interest. At first the piers jutted out from the irregular shore line, leaving the docks between; then filling in began, and the piers were extended out farther and farther. Such was the encroachment into the waters by this growth of territory that finally a harbor line was established, beyond which no structure was allowed to be built.

A study of this territorial growth suggests a present danger. The city proper has increased its territorial area from that of the original peninsula of 783 acres to 1,801 acres, by filling in and extending its shore front from the fringes of flats originally surrounding its borders. Great Cove alone, which is the filled area lying between Foster's wharf and Battery wharf, gave 112 acres to the business heart of the city.

Without describing the additions of territory made by filling of flats adjoining East Boston, Charlestown and South Boston, it is sufficient to call attention to those great reclamations for the purpose of pointing out that, while they have been of undoubted value in the business growth of Boston, they have at all times been encroachments on the harbor. To what extent they might have advanced but for the establishment of harbor lines by the Commonwealth and by the Federal government is not necessary to speculate upon. It is enough for the present purpose to point out that, with the growth of business, the wharves constantly encroached upon the harbor until they brought up against the commissioner's line. The same method of growth is still continually going on, and the wharves on the harbor front are gradually undergoing conversion from

the purposes of commerce to that of storage and industrial uses, because they can offer higher prices for propinquity to business centres than commerce can afford to pay for wharf accommodation.

In any growing sea-port it is natural for warehouses intended for water-borne goods to be located on, or as near as possible to, the wharves and landing places of the cargoes. In course of time, also, those manufacturing industries which depend upon water carriage for their raw material will naturally gravitate to the landing places. These and other such normal encroachments have a tendency to increase the property value of the wharves, until in process of time any revenue likely to be derived from a purely maritime use of them yields but small percentage on the assessed valuation. As a result, the owners of the wharves become anxious to put them into more profitable service, and in so doing are tempted to yield to the prices which merchants are willing to pay for the privilege of using the wharves for purposes other than landing goods and cargoes; and so the wharfing benefits in the given locality are lost to the community, and have to be sought elsewhere. The elsewhere, when found, is necessarily farther from the centres of business and where wharfing is cheaper, but whence the charges for transportation of the goods and cargoes to places of destination and delivery are enhanced; and in time, by further removals and greater inconvenience, such charges may become prohibitory on a given class of importations, or on cargoes water-borne in competition with railroads, resulting in a great loss to the port, and one which may never be regained.

It may be noted that since writing the foregoing the proposal to remove the canal-boat wharves in New York from East River round to North River is meeting with serious opposition, on the ground that the cost of carting incidental to such removal will kill the canal-merchandise business and destroy that water carriage in competition with the railroads.

In the sharp competition of business, industries of various kinds are constantly warring upon one another. Here in New England we are accustomed to witness the rise and growth of municipalities devoted to the production and development of a single class of industries, as, for instance, our great mill and boot and shoe towns. In the metropolis of New England, however, which is a great commercial port as well as a great industrial centre, one looks for the growth of business of every kind, realizing that that which requires large areas must find locations in suburbs, where land is cheaper, while that which is concentrated and is of lesser bulk and requires less space comes nearer the heart of the great city,— as witness the lofty office buildings, filled with banks, insurance offices, trust companies, corporation and private offices of all kinds.

For several generations the water front of Boston proper —that lying between the lower bridges — changed in character under the influence of the laws of growth, in which time the wharf line has been gradually extended into the water area, until a half a century ago, as we have pointed out, a line was drawn beyond which the Legislature wisely said that no further encroachments should be made into the river and the bay.

In this time also the use and ownership changed; and now the water front between Charlestown and Congress Street bridges, a distance of 8,720 feet, is occupied by thirty wharves. Of these, three and a portion of five other wharves are used by regular coastwise steamships. One exclusively and a portion of three others are used by harbor excursion boats. Six wharves and portions of very many others along the water front are used for purposes other than the landing of cargoes from vessels. Eight wharves and a portion of six others are used by both foreign and coastwise steamers and sailing vessels for the landing of coal, fish, lumber, hemp, wool, etc. Between Fisk's wharf and Rowe's wharf are four landings for the various ferries. Five wharves were taken in 1894 for a public park. In addition to the foregoing, the

entire front on the west side of Fort Point Channel, for the distance of half a mile, bordering on the harbor line between Congress Street and Federal Street bridges, has been taken for a public street.

The history of great sea-ports abroad shows what vast sums of money have been expended in simply preparing channels, docks and basins for the accommodation of vessels, and that in some instances large areas occupied by buildings, and at Glasgow by costly dwellings, have been purchased and excavated in order to provide dock and wharfage facilities for commerce. Commerce has to pay a toll for the enjoyment of all these privileges; but the tolls paid abroad are exacted by ports more or less in competition with one another, and do not afford any guide for us. If we were to make like charges in Boston, we should soon find the lower rates at competing ports in this country destroying our business.

Every effort is put forth in our great sea-ports to-day to discover how to diminish the necessary charges and tolls on cargoes and vessels arriving and departing; and the nearer the approach to substantial freedom from port charges the more nearly the desired ideal is attained. It is because of the port charges at New York, which are large in comparison with charges at other American ports, though not with ports abroad, that the port of New York is losing business. It was because of the high port charges at New Orleans that the recent great changes there have been brought about.

Nor is this effort to reduce port charges on vessels and cargoes confined to this side of the Atlantic. Not only do we find lowering of rates at Glasgow, Southampton and Liverpool, but we find Manchester (as we have seen) entering into its gigantic enterprise of building a canal for the purpose of enabling it to import direct at less cost than it can through the medium of Liverpool.

Thus we are led both by American and European examples to see the necessity of applying the principles of economy to

any plans which may be projected for the improvement of the port of Boston.

Unless some way be devised for preventing the encroachment of manufacturing and mercantile interests on the water front, the wharves will become entirely absorbed for those purposes, and commerce will be driven away from the centres of business. It is therefore even more necessary at the present time to consider and devise some plan for protecting the wharves from further encroachments than it was fifty years ago to establish a commissioner's line to prevent further extension of wharves into the harbor. At the same time, we must be governed by that economy which requires subdivision of labor in large manufactories, and which has led great ports to classify and arrange for the transaction of different kinds of business in different localities specifically set apart for their several conveniences; and, as Boston is now the centre of an immediately surrounding population of nearly a million, and the natural port of a large section of the continent, we should be foreseeing and wise enough to provide by proper classification for the future needs of the port.

In attempting to provide for a systematic development of the harbor front, regard must be had to present conditions, which exist as the product of a comparatively unrestrained growth of two centuries and a half. And in this connection it may be proper to say that merchants of high standing and character have given testimony before this commission in serious opposition to the idea of public ownership, and in support of the claim that individual enterprise and private means may be relied on to furnish accommodation as fast as the needs of commerce shall demand. Their point of view appeared to be that the port should be considered a means or medium for private enterprise and gain alone, and that the public has no interest to preserve and develop beyond what the Federal government is accustomed to do.

It is true that maritime commerce is a grand total of indi-

vidual effort selfishly addressed to the shipment, tranportation and delivery of merchandise, with a view to gaining personal profit, and that a great volume of such commerce makes a great port. Yet such a port has not only individual but common objects of interest and common duties and obligations. In every local government, after the immediate functions of self-maintenance have been exercised, there remain the ultimate functions of meeting the needs of the community, and the obligations to institute and administer public works in the common interest, — as, for instance, schools, roads, bridges, sewers, water supply, parks and grants of eminent domain for quasi-public corporations and interests. If the growth of this port is desirable, there is clearly need of administering its facilities and advantages in the public interest.

The limit of exercise of these public obligations is somewhat difficult of definition, but the film of too conservative doubt is often cleared by the conclusions and actions in fellow communities. So far from relying exclusively on private interests to supply the common needs, experience has shown that their encroachments and abuses must sometimes be resisted and curtailed. It was private interest that led Mr. Astor, in the year 1810, to lease on a long term from the city of New York certain lots in the lower part of the city, aggregating 425 feet and 4½ inches along the water front, at a yearly rental of $356.91, and which, in the year 1892, enabled his heirs to recover, after a long and expensive course of litigation, the sum of $520,709.49 in consideration of their relinquishing the claim they held to wharfage rights upon this property. It was private interests that led to the filling in of the water front of New York between Gansevoort and Charles streets on the North River, which has now to be excavated at the enormous cost of over $5,500,000. It was private interest that led the Illinois Central Railroad to claim the lake front of Chicago, until after prolonged litigation the supreme court of the United States ordered them to yield it to the

public, to whom it belonged beyond the power of the State even to deprive them of it. It was private interest that resisted the Harbor Commissioners in the State of Washington with numerous suits, all of which had to be fought and the decision of the highest court obtained before that which belonged of right to the public was yielded. Even while we are mindful that the present phase of competition which leads the railroads to offer free dockage as an inducement to shippers to bring freight for haulage is calculated to encourage the expansion of commerce at the port where the inducement is held out, it should at the same time not be forgotten that this is the act of a corporation in its struggle for business, animated by the motive of increasing its dividends for its stockholders, and that the benefit which the public derive is merely incidental, and may be diverted or denied at any moment whenever private interests require such action. And, finally, we have witnessed the greedy growth of private interests here in Boston, filling up the coves, the canals, the inlets and bays, and even crowding into the harbor before the commissioner's line was established.

So much for the reliance that may be placed on private interests to look out for the public welfare.

On the other hand, we find that the controlling powers at all the great leading ports in Great Britain and her colonies, on the continent of Europe and in the United States, with few exceptions, have established public ownership and control.

In this country we see New York, Philadelphia, New Orleans and San Francisco indorsing its principles in making new projects for increasing their commerce. The eminent board of consulting engineers on New York docks and wharves, in its report, to which we have already referred, says: —

> Foreign commerce is now dependent on steamship service. The city of New York has been built up and lives on foreign commerce;

as the prosperity of the city depends on this foreign commerce more than on anything else, the development of this commerce should be given preference over anything else; this means that the provision of the best possible facilities for ocean steamers must be the leading idea in considering the best plans for the New York dock system.

This appears to be in accord with the view of the able engineer at Southampton, Mr. John Dixon, that at the present time ports should be built to suit the ships.

In view of the existing ownership of the improved wharf property in Boston under its diversified uses, and of the danger of checking that progress which has already for the first time carried our export values during a single year beyond the one hundred million mark, as well as of the fact that there is a large surface of unimproved water front sufficient for the needs of a rapid commercial growth for a long time to come, it is not deemed wise to recommend that at present any improved property be taken for public ownership.

One of the main objects in the movement resulting in the appointment of this commission lies in a desire to have the port of Boston securely fitted for its due share of the world's commerce as it is carried on to-day. That object would hardly be realized by condemnation of any of the wharves on the front of the Boston peninsula, inasmuch as they do not furnish the physical conditions required. Moreover, these wharves are already exceedingly valuable to the public for the coastwise and fishing, ferry and local passenger service for which they are now largely used, and for which, especially as regards passenger accommodation, the demand is growing. The wharves belonging to the railroad and transatlantic steamship companies are already occupied in the interest of the foreign export and import trade, and the railroads furnish free dockage to the steamships running in conjunction with them, and free wharfage for merchandise to be transported over their rails. A careful view of the situation justifies the policy that is content with shaping the future development of the port in

conformity with modern requirements, by as little disturbance of existing conditions and methods as the nature of the circumstances will admit.

Of the 49,370 feet of wharf frontage on the harbor line, below bridges (not including the Navy Yard), 8,400 feet, or about one-sixth, is owned by the railroads; 30,970 feet, or about three-fifths, is owned by private individuals, land companies and other corporations; 9,150 feet of water front on the south side of the harbor, east of Fort Point Channel and extending to the Reserved Channel, as yet imperfectly or not at all developed, is owned by the Commonwealth; and about 1,000 feet of frontage of the peninsula is owned by the municipality.

The improved properties under this diversified ownership have now become fully occupied by the various harbor and coastwise steamers, the domestic coastwise vessels, the regular foreign steamship lines and ferry boats; and any increased demand in any one of these directions would encounter great difficulties in finding additional accommodation in any other way than by the improvement of some of the undeveloped frontage. During the past year steamers consigned here have been obliged to anchor in the stream, awaiting an opportunity for discharging; * and others would have come here but for this crowded condition of our wharves. It is not material how many have encountered obstacles and difficulties here through lack of facilities; the important fact that we have to consider is that some vessels fail to find here the accommodation they require, and which it is our truest interest to provide, and that, too, a little in advance of the demand.

There are a few wharves which might, by large outlays, be fitted for the requirements of modern commerce; but the owners seem to be content with the returns they now receive, or, for some other reason, are indisposed to make improve-

* See letter of Henry W. Peabody, Appendix, page 143.

ments. The larger number of wharves are not only occupied to the apparent satisfaction of their owners, but they are really incapable of being adapted to the needs of large ocean commerce.

In all the great ports abroad there are found ample accommodation and often special inducements to companies to establish regular steamship lines. The ownership and control, whether public or quasi-public, which exists in all foreign ports is managed almost universally on the theory of supplying accommodation in advance of demand, and thus having on hand, as it were, available dock and wharf space when wanted. It cannot be denied that the working of this theory has largely aided the building up within the past fifty years of such ports as Liverpool, Newcastle and Glasgow in Great Britain, and Rotterdam, Hamburg, Antwerp, Havre and others on the continent.

The Business of Boston, how and by whom it is carried on.

The total water-borne freight received and delivered at the port of Boston for the year ending Dec. 31, 1895, was in round numbers 8,000,000 tons, the value of which cannot be obtained from reliable figures. The different classes into which our total merchandise tonnage may be divided are in round numbers as follows: —

	Tons.
Coal cargoes,	3,500,000
Cargoes of coastwise line steamships,	2,000,000
Cargoes of foreign line steamships,	1,500,000
The balance of various cargoes of about	1,000,000

is accounted for under the head of foreign and domestic business carried on in what may be called "tramp" steamers and sailing vessels.

In the absence of published statistics relative to the total tonnage of the port the above figures have been collected from

original sources of information, such as the books of the Chamber of Commerce, local and foreign steamship agents and railroad and wharf representatives. A little more than one-half of the coal receipts were delivered direct to the railroads, the balance being landed upon wharves of dealers and consumers.

The coastwise commerce of the city is large and growing. Out of 11,372 vessels of all classes arriving here during the year 1895, over 9,000 were engaged in that business, which, however, has undergone many changes in the last twenty-five years, the greater portion of it now being done by steamers. The coastwise steamer lines are a very important element in our transportation business, and it is through them that we are able to get low rates of freight, not only to the ports to which the steamships ply, but to points reached by railroads with which they connect. The amount of tonnage transported by them shows their great benefit to the commerce of the port.

Increasing quantities of manufactured goods are shipped from this port to the west by water. Goods to lake ports, as far west as Duluth, are shipped by way of New York, thence by river and canal to Buffalo, and thence to their destination by the lakes. Similarly, goods are shipped hence to southern ports, and thence by rail to their destination. It is a fact worthy of note that not infrequently the best rates that can be obtained by rail are fifty per cent. more than all water rates for the same class of goods.

By far the larger part of this tonnage is by steamships. The vessels run on established lines, at regularly recurring intervals of time, and occupy exclusively certain wharf terminals. The sailing craft also are numerous, and give cheap transportation with eastern and southern ports.

The fact that the coastwise business is done to a greater or less extent in competition with the railroads, and has a tendency to lower transportation charges, should be emphasized. It represents a class of common carriers of merchandise which it

would be difficult to attempt to control by combination. Its development should be encouraged.

It is a fact worthy of observation that berth and wharf accommodation is growing scarce, and that occasionally coastwise cargoes find it next to impossible to secure a suitable wharf at which to land.

The business of the foreign steamship lines to and from this port has in the same time enormously increased. No other port in the United States can show such a gain. Our exports alone have advanced in value from about $14,000,000 in 1870 to over $100,000,000 for the year ending Sept. 30, 1896. This is the largest relative gain of any port in the country.

The competition for this export business in our seacoast cities has become so severe that it is necessary to provide the best port facilities in order to hold it. The managers of the Boston railroads, realizing the importance of this traffic, have during the last two decades, at great expense, built terminals to connect with the ocean steamship lines, which are second to none in this country; and it is largely owing to these increased facilities that this vast growth in our export business became possible. The certainty and regularity of sailing of the steamships which connect with the railroads give our local merchants an opportunity for frequent shipments, and also offer an inducement for the establishment of industries connected with the export business. Boston is the third meat-packing city in the country, and largely so on account of superior exporting facilities. Shipments of manufactured goods by steamship lines is steadily increasing.

There are, without doubt, currents of commerce which, once in full swing, draw in an increasing business, the reason for the growth of which it might be difficult, or at least unprofitable, to analyze; but there are certain fundamental requisites for building up and retaining business of all kinds, and among them are economy, uniformity and stability in charges. The exigencies of competition which have occurred since the organ-

ization of this commission have compelled reduction of charges in Antwerp, Liverpool, Southampton, Havre and other ports abroad, and have given rise to some of the most serious of the contests before the Interstate Commerce Commission at home in the effort to equalize charges for transportation from the interior to the seaboard. The loss to Boston of the foreign export business with Africa and the East Indies is, according to the testimony of her merchants, in some degree attributable to the wharfage charges on goods shipped from this port.

On the other hand, the increase of the exports hence to Liverpool is attributed to freedom from dock and wharf charges against vessels working in close conjunction with the railroads and loading from their wharves, where such charges, if made, would have been prohibitory of such development. Indeed, it is this working arrangement between the railroads and steamships which has been the means of raising Boston to her present eminence of second in export valuation. The volume and growth of her commerce is exhibited in the following table, showing the total values of foreign imports and exports for a series of five-year periods, ending December 31 of each year: —

YEAR.	Importations.	Exportations.	Total.
1875, ...	$47,106,105	$33,886,495	$80,992,600
1880, ...	68,649,083	67,838,296	136,487,379
1885, ...	53,576,300	54,521,579	108,097,879
1890, ...	66,064,601	72,489,107	138,553,708
1895, ...	79,881,556	89,019,873	168,901,429

The objection is sometimes made that grain and other shipments through the port are of little value to the community, and not worthy of cultivation. The growth and success of Rotterdam, however, is dependent on just such business; its port is a mere depot, where goods change bulk on their way to ultimate destination. Hamburg and Antwerp are also

actively engaged in breaking cargoes and forwarding through freight.

Those cities have spent millions in the last quarter of a century in improving their waterways, and in providing the most approved accommodation for their commerce; and their merchants are untiring in their efforts to bring home new steamship lines and increase their transit business.

The indirect benefit of frequent arrivals of regular lines of steamers in the reduced rates on imports, which such a condition generates, ought to be availed of to make Boston one of the cheapest markets for imported goods in the country. The wharf and dock owners in Boston long realized the undesirableness of a lack of uniformity in charges, and back in the sixties, as the commerce of the port was diminishing, agreed on a table of rates. It is not used to-day, however, and wharf and warehouse charges all depend upon the passing demand or necessity of the user. A charge for landing a cargo is not the same at all suitable wharves, and therefore cannot be reckoned in the estimate of an importing merchant. It need not be argued that accommodation which might be reckoned on at a fixed rate for a given length of time at any season of the year would encourage, and the opposite conditions would discourage, business.

It is not easy to see where, or to say how, the business of the port would suffer from the adoption of public ownership of docks under such limitations as we shall recommend. On the contrary, such experience as the history of other ports affords gives every assurance of benefit and advantage to this port from such a change as is proposed.

The existence of harbor lines and a Board of Commissioners for a quarter of a century, the first natural step toward public ownership and control, has operated beneficially. All new structures and the replacing of old ones in tide waters are under their jurisdiction, and must be licensed to be lawful.

The ownership and occupancy of the wharves are at present

quite diversified. The railroads own large frontages, and give free dockage to steamships bringing them freight or taking it from them. And this is by far the larger volume of business of the port. It is well known that grain is hauled here from the west by railroads on a small margin of profit, and that any interference with the present freedom of action might seriously impair, if it did not wholly destroy, that business. Such a result of itself alone could not be considered with indifference; but, with a diminution of steamship arrivals, the opportunity which our merchants now enjoy of importing at low freights would be liable to be lost. Because of these and other considerations it is undesirable to disturb the nature of the ownership of railroad wharf property in the plans to be submitted.

Twenty-two years ago the Harbor Commissioners recommended the filling of the Commonwealth's South Boston flats, so called. This was a natural sequence to the recommendation for building a wall on the site of the present north-eastern bulkhead of the flats, in order to direct the course of harbor currents. The filling has been going on for years, and a large and valuable property, with ample water front, is the result. The north-eastern corner of this property was purchased by the New York & New England Railroad Company, but for financial reasons it has hitherto failed to meet expectations in the way of development. It is now in stronger hands, having passed into the control of the New York, New Haven & Hartford Railroad Company. About 9,150 feet of the frontage to the Reserved Channel continues, however, as the property of the Commonwealth. It is contiguous to this railroad system, and can readily be connected with it by rails. It is submitted that no better place than this territory affords could be found wherein to try the first experiment of a public dock. If there should arise a demand for its exclusive use, it might be leased for a term of years, and another built alongside of it, and so on, until the water front on these flats shall be occupied.

For reasons heretofore given, it would be unwise for the Commonwealth to sell the fee of this water front; for, by retaining control of the reversion at the end of the leased period, it reserves the power of preventing misuse or abuse from any source. The ownership of the water front (the line between the land and water), the natural barrier to trade and commerce, should ever remain under the control of the people, and should never be parted with for more than a comparatively short term of years. This is the demonstration of all experience. Freedom from unwise restrictions and the power to reduce tolls for docking and landing should always be assured to the people in order that their will may be able to be operative whenever the public welfare demands its assertion.

In these days, when individuals are dwarfed by gigantic combinations and syndicates, by corporations and trusts; when great cities, like Liverpool and Southamptom, Rotterdam and Hamburg, compete in rivalry for commerce; when the Atlantic seaboard cities of our own country exert every effort of civic influence to direct the course of trade, each in its own interest, — it would be an abnegation of opportunity to remain idle, expecting individual enterprise to overcome all the obstacles in the way of creating a great commerce, and of enabling the natural advantages of this port successfully to vie with its rivals. It is obvious that individual enterprise cannot be relied on to take such a risk. The alternative then presented would be a combination of individuals, — a syndicate, a trust. This possibility can hardly be deemed remote in the light of present combinations prevailing throughout the country. The question then becomes narrowed to a preference between a trust, or monopoly of the harbor, to which all commerce would have to pay tribute, or public ownership as herein limited.

With an improved harbor, and with her lines of railroad stretching to the far west, for which she is a natural gateway to the ocean, Boston should look forward to a great future.

The great cities of the north-west have just begun to grow. Our trade regulations should grow as they grow; and, tied to them by rails of steel, Boston should be their port. The past fifty years has trebled the population of the United States, has developed Canada, has opened up South America, Australia, New Zealand, South Africa and parts of India.

Developments such as these quicken a realization of the importance of looking ahead and preserving for future use opportunities like the present of securing and dedicating to public ownership and control an available portion of the water front.

We accordingly recommend the acquisition by the Commonwealth of a limited area of unimproved water front within the harbor lines, upon the location and in the manner hereinafter set forth.

III.

"If Public Ownership of a System of Docks and Wharves in Boston is advisable, in what Manner can the Necessary Water Front best be acquired and improved and used so as to practically inaugurate such a System? What will be the Probable Cost of such an Undertaking? In what Way can the Needed Money best be obtained? How should it be expended, and who and what Authority or Agency should have Charge of the Construction of New Docks, and the Maintenance of the System when in Operation? Is it advisable to restore to the Commonwealth the Ownership and Control of all or any of the Flats in Boston Harbor not now owned by the City of Boston?"

What Acquisition shall be made, and how shall it be improved and used?

Having already decided not to invade the ownership of improved wharf property, we find a considerable tract of water front and flats lying adjacent to East Boston and Winthrop, and another considerable tract between Old Harbor and Ne-

ponset River, both of which are at present unimproved. It is unsatisfactory to attempt to forecast the wants of the future; but it is generally believed that a large expansion of commerce in grain, cattle and packed meat goods will come through the railroads having their shipping terminals on the north side of the harbor, and that accordingly it would be well to acquire and preserve a strip of foreshore at East Boston sufficient to guarantee the public against any possible dedication or use antagonistic to the growth of ocean commerce. The reasons for selecting the other tract will be referred to later.

As to the manner of acquisition of such water front as may be authorized, it is enough to say that there has existed in this Commonwealth from time immemorial provision for taking land for public purposes, which provision gives an appeal to a jury to any one dissatisfied with the damages awarded for the taking; and we know of no suggestions to improve that method, and therefore recommend its adoption in this instance.

As to the manner of improvement and use of such land as may be acquired, we believe that no immediate action need be taken. The Commonwealth, as we have hereinbefore indicated, has already a large tract of land known as the Commonwealth's flats at South Boston, conveniently located with a fine frontage on the harbor line. They are contiguous to the New England Railroad, and also can be easily connected with the Union Freight Railroad at Atlantic Avenue by a bridge across Fort Point Channel at the foot of Oliver Street, where the city now owns a wharf taken for that purpose.

No better use could be made of this property than the one long contemplated, and we therefore recommend that a model pier and dock, with every modern appliance needed for the economical and speedy handling of cargoes at this port, be forthwith built on the Commonwealth's flats at South Boston, with a view to meeting the demand for such additional accom-

modation; and that, when built, the same, if wanted for exclusive use, be leased for a term of not exceeding fifteen years; and when so leased, or fully occupied, another such dock be built, answering to the requirements of the then period, — and so on, as long as the demand shall continue. And if, meanwhile, a demand for a wharf or other improvement in the East Boston tract or in the Dorchester Bay tract shall arise, for foreign or domestic purposes, that then such improvement as may be wanted shall be made.

In this way, it is believed, the advantages of public ownership as elsewhere demonstrated may be acquired and retained at this port, for the benefit of the present generation and posterity, at a minimum cost.

"Is it Advisable to restore to the Commonwealth the Ownership and Control of All or Any of the Flats in Boston Harbor not now owned by the City of Boston?"

For reasons hereinbefore stated we believe that a controlling quantity of the foreshore or water front should be permanently held by the Commonwealth.

The foreign commerce of the port is growing, and the location of wharves and docks ought to be as near as possible to its base of supplies, — to wit, the railroads. The Commonwealth's South Boston flats and Dorchester Bay are a sufficient provision for the south side of the harbor. On the north side the accommodation is altogether inadequate, and any discussion of the enlargement of the area to be adapted to the wants of commerce would be imperfect should it fail to consider the needs of a century in advance of the present time. A glance at the map discloses a channel on the north side of Governor's Island, of ample depth through most of its course, from Broad Sound to a point opposite Bird Island

flats. The utilization of this channel in contemplating any project for future development should not be left out of view. With but a slight amount of dredging it would furnish an adequate channel for a very considerable commerce seeking berths on the proposed East Boston front north of Jeffries' Point.

While it is impossible to foretell within what time the expansion of Boston's commerce may need to occupy the territory covered by this project, we are satisfied that it would be wise for the Commonwealth to reclaim the ownership in a strip of the flats, not owned by the city of Boston, fifteen hundred feet wide, lying westerly and bordering on the Pier-head line, from a point beginning where said line makes an angle in the line of Sumner Street extended easterly and about eight hundred feet from the present abutment of said street, and thence following the Pier-head line around to its northerly termination on Breed's Island, excluding the flats of the city of Boston covered by said strip. The proposed width will give ample accommodation for piers and docks, and at the same time leave in the rear of and abutting on the same a strip of territory sufficient for the purposes required, as incident or accessory to the use to which the premises are to be devoted. This belt we deem to be a sufficient reclamation, for some time to come, of the foreshore on the north side of the harbor.

There are other flats on the south side appurtenant to Cow Pasture, Savin Hill, Commercial Point and beyond — that is, the flats lying between the southerly end of the Strandway as at present located and of the city at Neponset River — to be considered.

Realizing that this territory is the foreshore of a district destined to be at no very distant day thickly settled by a dense population, it ought not to be a matter of indifference as to whether that shore is preserved so that it may be accessible to the wants of the next generation at reasonable cost. By its

investigations and studies this Board has been greatly impressed with the value of waterways sufficient to carry the cumbrous merchandise in the shape of brick, lime, cement, lumber, coal and raw material for manufacturing purposes as near as possible to the places where they are to be used. Not only is the carriage in itself by water cheaper than in any other way, but the streets are relieved from a crowding incident frequently to the carting of materials, as well as from the wear and tear and necessary cost of repair caused by drawing loads of these heavy materials over their surface.

It is therefore recommended that the Harbor and Land Commission have authority to condemn and take any portions, or all, as may to the Board seem best, of the flats lying between the bulkhead line and the Pier-head line, established by the United States Harbor Line Board of 1888, and approved Feb. 13, 1890, together with a strip of land adjacent to, and only where adjacent to, the flats taken as aforesaid between said bulkhead line and said Pier-head line. Said strip to be so limited in width that at no point at which a line may be drawn at a right angle to the Pier-head line shall the space reserved between the two harbor lines aforesaid and the strip so taken, when added together, be more than seven hundred feet wide. The object to be gained is not only owning dock frontage, but a street or way of ample width for possible use at the head thereof. It is estimated that the number of feet of flats and marsh so authorized to be taken will not exceed 20,000,000, as improved properties have been omitted from the estimate.

All takings should be made within two years of the passage of the act authorizing the taking, and be subject to the approval of the governor and council.

"What will be the Probable Cost?"

The immediate expenditures in carrying out the recommendations herein made would not be large, nor would they at any time be considered great, as measured by the advan-

tages to be obtained if made in the conservative and guarded way proposed.

Flats.

The purchase of the strips of flats on the East Boston and Dorchester Bay shores, taking in not over 20,000,000 feet, ought not to exceed one-half to three-quarters of a million dollars.

Dock.

The building of a model dock ought not to exceed half a million dollars.

Thus, with an expenditure of less than a million and a half dollars, certain invaluable results can be accomplished. If the project proceeds no further, the benefits will be permanent, and will be worth what they may have cost, and further development may be arrested without materially, if at all, affecting the value of the previous outlays.

"In what Way can the Needed Money best be obtained?"

In the same way that an individual who wished to develop his property might seek to obtain it, and that is, by borrowing money needed for the development on the security of the property.

First. — For improving the Commonwealth's South Boston flats as heretofore outlined. The cost of this improvement is estimated to be not over $500,000, which should be paid out of the Commonwealth flats improvement fund, — a fund already established, and represented by 170 acres of filled land, lying on either side of Congress Street or new Summer Street.

Second. — For procuring the strip of East Boston flats. Let the money therefor be borrowed by the Commonwealth on long-time, low-rate, sinking-fund bonds, and let any money desired for developing the same be raised in the same way, and

let the rentals be based proportionally on a sum sufficient to pay the interest, annual charges and a sinking fund relative to the portion leased.

Third. — For procuring the Dorchester Bay flats. Let the money be borrowed by the Commonwealth, and provision for payment be made in the same manner as provided for the East Boston flats.

How should the Money be expended? "Who and what Authority or Agency should have Charge of the Construction of New Docks and the Maintenance of the System when in Operation?"

The expenditure of money incurred by this project should be made on the recommendation of the authority or agency having charge of the construction and maintenance of the docks and wharves, to be approved by the governor and council, and be paid by the treasurer of the Commonwealth.

The two forms of authority or agency most considered by your commission have been the harbor trust, or English form, which enjoys the confidence of the English people and seems to work well under their conditions, and the American form of a board of commissioners.

The harbor trust is a well-balanced board, which aims to represent all the different interests, and is for their purposes practically, as well as theoretically, quite perfect. It is, however, better adapted to English ideas and habits, and, although partially adopted at some ports on the continent of Europe, has never been tried in the United States. To us it has the objection of being unfamiliar and untried, as well as more cumbersome. For these, among other reasons, it becomes a question whether, though otherwise desirable, it would commend itself for adoption here.

A board or commission is a usual depositary of delegated power in this Commonwealth, and in other States. It is one to which we are accustomed. It has existed for many years, has been serviceable to the public and substantially free from scandal. It is conservative, and yet kept in touch with growing wants and changing requirements by its accessibility to the public and the short term of appointment of its members. It is natural, therefore, to regard a commission as the most trustworthy and best understood agency to receive this new trust. Whether an entirely new commission, with its attendant expense, is necessary to carry out this project, or whether such a duty may not be engrafted on an existing board, are questions to be considered.

The objection to creating another commission to accomplish work the nature of which is quite in line with that already performed by an established commission is obvious. The subordinate duties involved in such a work can be systematized, classified and carried on by skilled and qualified agents to an indefinite extent. The more completely corelated subjects can be brought under one head, the more stable and consistent will be the policy and the more uninterrupted and economical the work incident thereto. The evils of divided jurisdiction are too well known to require argument.

The Board of Harbor and Land Commissioners already have jurisdiction over tide waters and harbors, as well as over great ponds and the Connecticut River. They have in charge the improvement of the Commonwealth South Boston flats, upon which the building of docks has for some time been contemplated. That Board also is the one best fitted by virtue of the maps, plans and information gained in connection with the general work of its office, to deal with the questions which are likely to arise in carrying on the proposed works. The office of the Board is, moreover, at all times easily accessible to the public for the purpose of lodging complaints, or

inviting consideration to any changes in rules and regulations which business interests may require. For these and other cogent reasons this Board, after the most careful consideration, is of the opinion that the most economical, effective and satisfactory body to perform the functions herein suggested is the Harbor and Land Commission.

IV.

"What Changes are necessary in regard to Railroad Terminal Facilities, and Connections with said Docks and Wharves? Does the Public Necessity and Convenience in Connection therewith require the Abolition of any Grade-crossings of Highways or Railroads; and if so, how can the Same be accomplished?"

Such changes are necessary as will provide the public wharves and docks, whenever the same shall be built, with easy and convenient connection with all the railroads now centring in Boston. Any public docks built on the South Boston flats may be directly connected with the New England Railroad at a very slight cost; and they may be also connected with the Boston & Albany tracks in several ways.

The situation at East Boston requires a connection between the proposed strip of foreshore bordering on the Pier-head line, heretofore described, and the Boston & Albany and the Boston & Maine railroads, and through their connections with all the other railroads.

In order to accomplish these objects most conveniently and advantageously for the public, a few comparatively inexpensive changes and additions are desirable. The projected wharves on the Commonwealth's flats would lie contiguous to the New England Railroad tracks. The removal of the freight terminals of the New York, New Haven & Hartford Railroad across Fort Point Channel, already accomplished, makes unnecessary the continuance of the tracks of their Union Freight Railroad be-

yond the nearest bridge connection with their South Boston terminals for the distribution of freight.

It would be to the advantage of the public if all freight requiring transportation across Fort Point Channel in cars and deliverance on the line of the Union Freight Railroad should avoid passing the southern union passenger station, thus diminishing the congestion of that district. This can readily be accomplished by building the long-talked-of bridge across Fort Point Channel at the foot of Oliver Street, where the city, several years ago, bought a wharf for that purpose, and by laying tracks across the same; thus making short connection with the new freight terminals of the Consolidated Railroad, and also with the projected public docks just beyond. A connection with the Boston & Albany Railroad would be made through the present connection of that railroad with the New York, New Haven & Hartford as it now exists. If the traffic should at any time demand it, another bridge across Fort Point Channel, near the Broadway extension bridge, or a tunnel under it, might be built. Thence the connection will continue over the tracks of the Boston & Albany Railroad, by means of its grand junction division, until the northern railroads are reached. Should necessity require the removal of a portion of the Grand Junction Railroad through the southerly part of Cambridge, then a connection between the Boston & Albany and the Watertown branch of the Fitchburg Railroad might be effected at a comparatively slight cost by crossing the river Charles at or near the United States arsenal at Watertown.

There was presented to the Board a plan for connecting all the railroads by a circuit road some twenty-five miles in length, which would most conveniently tap all the main lines a few miles outside the city; but after careful consideration it was found that the cost of the line and its maintenance would add so much to the charges for terminal delivery beyond those required by the present system of operation of the railroads,

or by the adoption of the car-float method, that this project was deemed impracticable.

A connection may easily be made between the proposed public wharves and all the other water-front terminals by a system of car floats such as is now in use in this harbor and in other competitive ports. This method is largely pursued in New York, where more than 1,000,000 tons of freight are handled yearly at single dock terminals, — as at Palmer's docks in Brooklyn and at the lake ports. At Manitowoc on Lake Michigan a train of thirty-six cars is transported across the lake on a single steam float.

The foregoing plans for connections will be found discussed in detail in the report hereto appended, made to the commission by the engineer, Mr. Thomas Doane.*

In view of the fact that the growth of commerce at this port has been largely in consequence of the arrangements made between the railroads and steamship lines, whereby each railroad undertakes to give preference to its own particular line of steamships in forwarding ocean freight, such plans as are herein suggested are intended to interfere as little as may be with existing conditions. The recommendations made by your commission have in view the placing of the premises on which public docks may be built within easy communication with all the railroad systems that centre at this port.

As to the situation at East Boston with reference to the abolition of grade crossings and other changes necessary to be made, your commissioners had hoped that under the provisions of chapter 491, Statutes of 1895, a solution would have been reached which would obviate the necessity of reporting any original plans. The subject of the abolition of grade crossings at East Boston is one which has occupied the attention of the city authorities and the railroads for a long time, and from time to time various projects have been submitted and considered. Your commissioners recently were

* See Appendix, page 133.

invited to a conference between the city authorities and the railroads, at which a plan prepared by the city engineer was presented and discussed; but, while the proposed plan was calculated to accomplish the desired end, the parties interested objected that the cost of the scheme was almost too great to be entertained, — the lowest estimate being $1,600,000. A considerable portion of that cost was for the purpose of obtaining the land on the northerly side of Marginal Street from Orleans Street to the Revere Beach ferry, and the building of new tunnels under Sumner and Webster streets.

There is no question that in the interest of economy the work of delivering and receiving steamship cargoes from rail carriage and street conveyance must be done on a common grade. It is at the same time only reasonable, notwithstanding the passage of the grade crossing acts, that railroads, when permitted to lay tracks in or across streets, with the object of making wharf connections, should have a right to expect freedom from the necessity of raising those tracks, or the street itself, in order to continue the service. Nevertheless, the propriety of abandoning a street to unrestricted railroad traffic would in most cases be questionable. These united considerations make it a matter of much moment to determine if some plan may not be devised and adopted whereby encroachments on the public streets may be reduced to a minimum, without, at the same time, doing any injustice to private or corporate interests.

In view of the recommendation hereinbefore made, that the public should own a strip of foreshore on the harbor line on the east side of East Boston, and of the desirableness of handy railroad connections therewith in the future, if not to-day, the problem of relocating the railroad tracks in East Boston becomes of exceptional importance. Inasmuch as the parties interested may reach an arrangement under Statutes of 1895, chapter 491, satisfactory to them all, without the necessity of any additional legislation, your commissioners

will refrain at present from making any recommendations in the shape of a bill, but will be content to report an outline of a plan broadly, which, if it were carried out, would be a great improvement on the present situation.

The changes we would suggest at East Boston involve certain relocations of the railroads, the abandonment by the Boston, Revere Beach & Lynn Railroad of its terminals where now located, and the substitution of another ferry, for which additional legislation would probably be required.

The Boston, Revere Beach & Lynn Railroad is a short suburban, narrow-gauge road, with a number of grade crossings, in East Boston, Winthrop and Revere; and, following the example of many similar roads in various parts of the country, it not unlikely may soon be equipped as an electric railway. In that case it should abandon its location from a point near the junction of Bennington and Trumbull streets in East Boston to its ferry landing on the East Boston side, and be given a location as an electric street railway, say through Bennington and Chelsea streets, thence through Maverick Square and Lewis Street, to the south ferry landing. Or if, as has been suggested, the present location of the Boston & Maine and Boston & Albany railroads, from the junction of Bennington Street south, were abandoned, and the city should acquire that property and lay it out as a boulevard through East Boston, a location could be given there, instead of the one proposed.

The city of Boston, under a recent act of the Legislature, Statute 1895, chapter 435, has now authority to establish a new ferry landing at or near Rowe's wharf on the Boston side. If the present ferries and landings of the Revere Beach Company were abandoned, nevertheless a passenger boat might be run from the foot of Lewis Street in East Boston to the present landing of the Revere Beach ferry on the Boston side, whereby the passengers over the Boston,

Revere Beach & Lynn Railroad, as well as all citizens of East Boston who might desire to be landed at that point, would receive the desired accommodation at a one-cent instead of a three-cent fare, as at present.

The Boston & Albany and the Boston & Maine railroads are at present located in the centre of the island, creating a barrier to the growth and development of the community, as well as being a constant menace to life and limb. It is believed that a relocation of the tracks of these railroads would be a more desirable solution of the problem than could be effected by any attempt to abolish the grade crossings over the present location. If they were to be removed to the location now occupied by the Boston, Revere Beach & Lynn Railroad, on the easterly side of the island, they would be within easy access to the shore front proposed to be dedicated to the system of public docks; where they could never interfere with the increase of dwellings; and would be in the heart of any expansion of industries whose interest it would be to keep them in undisturbed possession.

They should be deflected from their present location near Curtis Street, and a new location be given them leading under Pope, Saratoga and Bennington streets, the grades of those streets being raised at necessary points; thence over a street laid out as Harmony Street to the location of the Revere Beach Railroad; thence along said location through the present tunnels of that road, — raising Maverick and Everett streets over the tracks, — across Marginal Street, and entering the property of the Boston & Albany Railroad near its easterly end. The Boston & Maine Railroad should be permitted to acquire from the Boston & Albany a strip of land bordering on the south side of Marginal Street seventy-five feet wide from a point where the tracks should enter their property to Clyde Street, there making a connection with their present property southerly of Marginal Street. In compensation for this loss of territory the Boston & Albany Railroad should be allowed

to acquire the property southerly of Marginal Street and easterly of their present boundary, now belonging to the Boston, Revere Beach & Lynn Railroad, which property, under the general plan proposed, would have been acquired by the city of Boston, and would be for sale. Ample car-storage yards could be acquired upon lands on both sides of the new location north of Maverick Street, much nearer to the wharf terminals of the railroads than those now used by them.

V.

"Has Business been diverted from Boston, or from any other Portion of the Commonwealth, by Discrimination in the Matter of Freight or Wharfage Charges, or for any Other Reason; and if so, how can the Present Conditions be remedied?"

On this question the testimony of merchants, railroad managers, steamship agents and others has been received by the commission, and a study of the conditions and business of other American ports as well as Boston has been made.

There have been many causes concurring during the past twenty to thirty years to divert business from Boston. Among them has been the instability or uncertainty of wharf charges. It has never been the custom to charge dockage or berthage to vessels with cargoes at this port, but to put the entire charge on goods landed on the wharf. This variation from the custom prevailing at most of the other competing ports has caused a charge to appear against merchandise delivered here which did not appear to shippers elsewhere, where such charge is absorbed in the freight and paid by the vessels. This evil has been enhanced by the uncertainty of the charge, which was made less when business was dull and increased when the demand for wharf accommodation was active, — varying as widely as from ten to forty cents a ton. This element of uncertainty has un-

doubtedly worked badly for the port, and has led merchants to do business at other places, where charges could be reckoned and discounted. As at New York, for instance, the system of pier charges, and the free delivery from the railroads to vessels and storage warehouses by means of lighters and car-floats, have constituted an advantage which has contributed to draw commerce thither.

In round figures there are received and delivered by water at the port of Boston 8,000,000 tons of freight. A very careful analysis has been made, to see what proportion of the same pays a wharfage charge. The coal receipts here amounted in 1895 to 3,517,000 tons, — of which about 2,000,000 tons were landed upon the railroad wharves for their own use or for transportation over their lines, and upon this, with the exception of a small quantity, no wharfage charge was made. The balance, about 1,500,000 tons, was landed upon wharves of dealers or at the plants of the consumers.

The annual receipts of merchandise by regular foreign steamship lines are about 500,000 tons, of which 60 per cent. or thereabouts is delivered to the local merchants, whereon a varying wharfage charge is paid. The annual shipments of merchandise by the same foreign steamship lines amounts to 1,000,000 tons. More than 80 per cent of this is brought by the railroads to their connecting steamship lines, upon which no wharfage charge is made. The balance is local merchandise, or is received from other railroad or steamship lines. Upon this, however, varying charges for wharfage are made.

The receipts and deliveries by the coastwise steamship companies at Boston, according to careful computation made from data given by them, and from the books of the Chamber of Commerce, amounted last year to 1,892,500 tons. Upon practically the whole of this no wharfage charge was made. The various coastwise steamship companies lease their piers, and the rentals thereof are charged to the general-expense account of operating the lines.

The receipts at this port, last year, from foreign ports by "tramp" steamers, so called, and sailing vessels, amounted to 500,000 tons. It is impracticable to obtain accurate figures as to what proportion of this tonnage paid a wharfage charge because many of the vessels were discharged at railroad terminals; but it is safe to assume that the percentage of that paid was not more than the percentage received from cargoes by the regular foreign steamship lines, — namely, 60 per cent.

From domestic ports the cargoes, other than coal, received here in sailing vessels amounted to about 657,000 tons. A very large proportion of this was landed upon the wharves of the dealers in lumber and other building materials, and upon that no wharfage charge could be reckoned, because of being absorbed in the rental of the wharves. Possibly, however, 30 per cent. of this tonnage may have paid a wharfage charge.

To sum up, it may safely be assumed that, of the 8,000,000 tons of freight received and shipped at this port, only 1,000,000 tons paid a direct wharfage charge, the balance being taken care of through rentals and other line arrangements of the railroads.

The decay of the Calcutta and East India trade, and the decline of our commerce with South America, Africa, Australia and Mediterranean ports, cannot seriously be attributed to wharfage charges, although as a lesser factor those may have had some influence; nevertheless, they constituted a ground of complaint. However well founded, their removal would probably have little influence in reviving the lost commerce with the countries named.

The growing tendency to develop commerce on regularly established ocean lines, to a great extent in close connection with railroad systems, is apparent in the absorption of the water front in our leading ports wherever the railroads can obtain possession. Enormous cargoes and low rates, with trans-shipment at intermediate ports, like Liverpool, in contact by steamship lines direct with all the ports in the world,

absorb the bulk of the business, and tend to cast the trade of the world more and more into such regular channels.

One of the direct results of this combination method of doing business is the making of a through rate to the shipper, free from all terminal charges or extras of every kind, and thus fostering the making of through contracts. As a consequence, the railroads or the steamships provide their own regular terminals, and all apparent charges therefor on goods in transportation or transference from one to the other are absorbed and obliterated. This is the growing method of doing business at ports in the United States, to which all transportation companies are adjusting themselves by making free terminal deliveries; and the ports themselves are encouraging it by agitating the question of reducing port charges, — going so far, even, as to talk about abolishing them altogether at New Orleans, and freeing her commerce from all port dues.

It would be difficult to exaggerate the importance of this question of reducing port charges, now everywhere most earnestly discussed. The improved navigation at the mouth of the Mississippi and the increased accommodation and low cost at the wharves of New Orleans will naturally draw to that outlet much of the grain of the Mississippi valley. The railroad port of Newport News, with its fine harbor and cheap terminals, will take a large volume of the grain which might otherwise seek New York. The cost of lighterage and handling at New York must place that port for many years to come at some disadvantage with other great sea-ports.

Boston looks to the great north-west as its natural tributary, with which its lake and rail connections are most favorable; and in competition with other ports she asks nothing more than that a uniform rate be established from interior shipping points to the great ports of the Atlantic sea board, equally the same to every port.

Boston is one of the many Atlantic sea-ports lying between

St. John, N. B., and Galveston, Tex., all of which are way stations on these highways of commerce, in which the producers and forwarders of the entire country are concerned, and which, by means of co-operating railroads, are making strenuous efforts to increase the import and export business through their respective ports. This export business recently has developed south and west; and the rates of hauling, the terms of which are settled by the Joint Traffic Association, are mainly based on the mileage to the ports. The authorized freight charges hitherto established have enabled Boston to do business in competition with New York and other competing ports, and under current rates our total import and export business has increased from $127,741,477 in 1880 to $152,394,341 in 1895.

The close business connection maintained here between the railroads and the foreign steamship lines is such that no wharfage charge is made upon goods or merchandise brought by the steamships to be delivered to and hauled by the railroads. The railroad wharves have been especially fitted for this class of business, and the arrangements at this port are not excelled in that respect by those at any other port in the country, either as to economy or despatch in handling freight. As a consequence of the existing conditions at this port, the ocean freight-rates quoted in western cities on breadstuffs to Liverpool are practically the same whether *via* Boston or New York.

The great benefit of the arrangement for free wharfage on goods passing through the port has been appreciated at Newport News, where substantially the same conditions exist, as well as at Philadelphia and Baltimore, and has been followed at New Orleans, where during the past month of October the Illinois Central Railroad Company has opened the Stuyvesant docks, advertising them to be free to the landing of all goods destined for transportation over its line.

This arrangement has, as heretofore indicated, left open a

ground of complaint on the part of local merchants that goods landed on a railroad wharf by a steamship, and not to be transported by that railroad, are subject to a charge. The attitude of the railroads with reference to this charge is that they maintain the wharves in the interest of their patrons and customers, and that it is fair to make a reasonable charge to others using their wharves; otherwise, they would receive no consideration for providing landing facilities. To this, so long as the railroad charges are reasonable, there would seem to be no valid answer.

To the complaining merchants, the present amelioration would seem to lie in the fact that, owing to this arrangement existing between the railroads and the steamships, a large export traffic is encouraged, whereby an opportunity for return freights at lessened rates and frequent sailings, on account of the great disproportion existing between imports and exports, is given. It has appeared in testimony that the tonnage seeking freight at Liverpool for Boston was so much larger than that for New York that there has sometimes been a difference as high as fifty per cent. in the freight rates in favor of Boston. Thus, while the local merchant is subject to a landing charge, he is indirectly indebted to the party to whom he pays that charge for the lower freight rates that more than compensate him, and which are no greater than he would have to pay at any private wharf.

While, therefore, insisting that certainty and stability of port charges are in themselves desirable; the fact that most of the wharves, other than those of railroads, are connected with storage warehouses; that the charge for wharfage on goods put therein is often eliminated; that the railroads make no wharfage charge at their terminals on goods shipped from and delivered to their lines; and the further fact that only one-eighth of the ocean commerce at this port pays any wharfage charge at all, — it is not thought

best to recommend any legislation providing that private wharves be subjected to any required system of charges as to vessels and goods; but, realizing that the present tendency is toward the elimination of the wharfage charge; that the system prevailing at this port is wrong; that, although charges are not as a rule unreasonable, there have been times when they have seemed excessive; and that the injury caused by a single error often mars reputation and damages business, — we take this opportunity of suggesting to the wharf owners, where charges are made, the propriety of arranging, so far as it may be within their power, that freights shall include deliveries, and thus absorb the cause of irritation.

Should a system of public wharves, such as hereinbefore recommended, be built, rates for their use could be established somewhat on the lines prevailing at the public docks at New York, San Francisco and New Orleans, under the rules and regulations of the governing body.

At all foreign ports a rate or toll is levied upon the vessel and cargo, and is substantially the same as the rates at Liverpool.

Switching Charges.

Other complaints of more or less significance were made at the hearings that the transfer and switching charges on car deliveries at the railroad terminals at this port were excessive, and it was thought that legislation might be recommended with a view to remedying the evil.

The Board, however, is of the opinion that power is already vested in the Railroad Commissioners to give relief in all cases of unreasonable, unfair or unequal charges of that kind. As has already been pointed out, unequal charges are not only unjust to the individual but are injurious to the public. The railroads, in performing their duty to the public, are bound

to treat all parties with absolute equality and without discrimination, so far as it is practicably possible so to do, and for any injury suffered an appeal to the commissioners is always open without unnecessary formalities or inconvenient delay.

Tariff Rates.

The most serious and far-reaching question of discrimination affecting Boston presented to the Board is one with reference to which any recommendation in this report would be wholly unavailing. It relates to the tariff of railroad rates between Boston and inland points. Under the tariff of the past twenty-five years our export shipments of western products have grown enormously. During this period the rate from Chicago to Boston for export merchandise has been the same as to New York. These rates were established by a commission, after a hearing and due consideration of all the elements and conditions which go to make up equalization in haulage. It is fully appreciated by all the parties interested that any change which might result in discrimination against Boston in western freight rates, beyond what already exists, could not be made without jeopardizing the commerce of the port, and therefore lessening the opportunity now afforded to all citizens of the Commonwealth to avail themselves of frequent shipments at low cost under the present conditions.

An examination of the following tables will bear testimony to the steady growth of the commerce of Boston in every decade since 1830; also to a maintenance of her relative position among her sister ports during the past twenty-five years; also to the value of her monthly exports since June, 1895; also to the nature and quantity of exports by a single steamship line during the year 1895, together with a sample of export and import cargoes: —

Value of Exports and Imports at Boston for a Series of Years ending June 30.

YEARS.	Exports.	Imports.
1830,	$2,506,302	$8,674,976
1840,	4,485,860	16,591,575
1850,	6,953,528	28,659,733
1860,	13,530,770	39,366,560
1870,	14,136,429	47,524,845
1880,	59,238,341	68,503,136
1890,	71,201,944	62,876,666
1895,	85,505,196	66,889,118
1896,	95,851,004	79,179,864

Value of Exports and Imports at the Principal Ports of the United States for a Series of Years ending June 30.

YEARS.	Baltimore.		Boston.		Charleston.	
	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.
1870,	$14,530,473	$19,512,468	$14,136,429	$47,524,845	$10,780,717	$505,699
1875,	27,615,822	27,788,992	30,866,033	51,982,226	19,655,966	680,343
1880,	76,253,566	19,945,989	59,238,341	68,503,136	19,591,127	202,790
1885,	45,052,904	11,849,696	62,000,103	53,445,929	18,882,566	446,901
1890,	73,983,693	13,140,203	71,201,944	62,876,666	13,788,751	646,644
1892,	98,850,197	13,418,523	87,175,636	71,780,489	16,718,386	896,681
1895,	61,938,991	12,260,706	85,505,196	66,889,118	10,712,471	666,752
1896,	66,398,905	13,476,630	95,851,004	79,179,864	8,497,732	502,297

YEARS.	Galveston.		New York.		New Orleans.	
	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.
1870,	$14,873,732*	$509,231*	$230,311,901	$293,990,006	$108,147,847	$14,993,754
1875,	16,225,907*	1,218,034*	344,703,969	368,637,580	71,613,982	12,356,487
1880,	16,749,889	1,094,514	392,560,090	459,937,153	90,442,019	10,611,353
1885,	12,679,154	1,157,370	344,514,761	380,077,748	79,147,574	8,688,552
1890,	24,446,831	415,792	349,051,791	516,426,693	108,126,891	14,658,163
1892,	35,386,256	1,317,000	413,952,783	536,538,112	131,252,873	18,909,553
1895,	41,886,651	369,575	325,580,062	477,741,128	68,413,362	13,861,507
1896,	36,397,091	602,770	354,274,941	499,932,792	80,986,791	13,468,469

* Includes all Texas, of which Galveston was the only port doing business reckoned in the statistics of the United States.

Value of Exports and Imports, etc. — Concluded.

YEARS.	MOBILE.		PHILADELPHIA.		SAN FRANCISCO.	
	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.
1870, . . .	$22,424,175	$1,349,488	$16,934,610	$14,500,797	$35,976,824	$21,834,103
1875, . . .	10,132,188	1,087,745	28,611,654	24,236,387	31,238,343	29,697,483
1880, . . .	7,188,740	425,519	49,649,693	35,944,500	32,358,929	35,221,751
1885, . . .	3,012,556	128,169	38,723,261	29,919,019	38,115,624	35,040,350
1890, . . .	3,372,429	107,015	37,410,683	53,936,315	36,876,091	48,751,223
1892, . . .	2,785,735	165,778	58,541,457	60,006,791	40,737,044	47,135,684
1895, . . .	5,173,303	1,009,281	35,043,093	48,802,676	24,373,148	36,269,637
1896, . . .	6,995,127	940,579	39,567,376	43,840,836	31,582,910	41,400,317

YEARS.	SAVANNAH.		PORTLAND.		NORFOLK AND PORTSMOUTH.		NEWPORT NEWS.	
	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.	Exports	Imports.
1870, . .	$29,749,058	$1,001,917	$3,792,938	$2,922,164	$1,307,440	$14,451	-*	-*
1875, . .	29,666,666	755,901	3,463,561	1,782,987	5,243,986	18,929	-*	-*
1880, . .	23,992,364	483,802	3,967,250	1,391,086	14,065,455	47,057	-*	-*
1885, . .	20,871,446	652,625	4,149,269	1,297,080	14,797,181	130,214	$3,131,689	$151,227
1890, . .	30,884,451	472,343	2,994,362	622,034	14,247,477	89,042	6,958,369	54,180
1892, . .	25,704,173	301,904	2,199,197	844,929	13,065,837	44,435	14,444,367	190,114
1895, . .	20,523,760	425,681	1,978,109	429,900	7,792,572	268,330	13,469,541	1,032,849
1896, . .	21,409,027	273,555	3,642,445	480,163	6,761,484	219,350	14,850,117	1,131,628

* Previous to 1883 no United States figures compiled. In 1883, exports, $1,509,689; imports, $18,255.

The following table is made up from the custom house reports, and, while it fails to show the actual tonnage of the ports, it affords the only reliable statistics, made up after a uniform method, from which trustworthy comparisons may be made: —

Registered Tonnage of Vessels entered and cleared at the Principal Ports of the United States for a Series of Years, ending June 30.

YEARS.	PORTLAND, ME.		NEW YORK.		PHILADELPHIA.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
1870, ...	175,175	229,782	3,093,186	2,971,924	300,006	282,639
1875, ...	244,565	320,442	4,421,074	4,311,433	582,295	624,185
1880, ...	122,723	198,298	7,611,282	7,429,802	1,391,312	1,240,364
1885, ...	132,558	203,905	5,659,733	5,440,724	1,638,167	921,276
1890, ...	107,993	152,803	6,258,222	6,025,518	1,410,640	1,119,454
1894, ...	138,409	179,122	7,121,527	6,964,927	1,431,901	1,261,067
1895, ...	116,060	134,252	6,688,595	6,499,490	1,426,795	1,284,639

YEARS.	BOSTON.		CHARLESTON.		MOBILE.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
1870, ...	793,927	570,233	36,332	52,812	79,249	79,738
1875, ...	768,678	632,873	102,023	119,274	43,352	58,950
1880, ...	1,347,447	1,235,752	116,283	143,218	61,471	69,181
1885, ...	1,152,415	975,495	124,785	143,754	89,558	96,710
1890, ...	1,404,828	1,208,507	86,710	120,969	126,576	127,436
1894, ...	1,696,118	1,430,828	97,809	101,118	198,899	208,469
1895, ...	1,689,967	1,425,611	99,741	107,139	260,917	271,481

YEARS.	BALTIMORE.		NEW ORLEANS.		SAN FRANCISCO.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
1870, . . .	272,290	246,569	458,447	561,458	393,983	493,555
1875, . . .	561,314	555,468	454,006	523,584	720,438	747,009
1880, . . .	1,502,713	1,491,060	760,910	858,755	704,054	777,595
1885, . . .	627,418	739,024	656,931	674,766	881,299	973,231
1890, . . .	845,239	1,124,262	1,019,522	1,015,550	1,030,538	1,030,974
1894, . . .	808,080	1,121,839	1,018,134	1,045,655	1,100,333	1,119,227
1895, . . .	630,907	977,350	999,773	997,996	1,142,650	1,078,954

Registered Tonnage of Vessels, etc. — Concluded.

YEARS.	SAVANNAH.		GALVESTON.		ALL OTHER SEA-PORTS.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
1870, . . .	86,110	136,437	31,555	52,701	558,929	683,780
1875, . . .	185,046	167,397	91,913	127,579	963,434	1,152,505
1880, . . .	183,895	170,092	117,972	99,007	1,331,267	1,577,563
1885, . . .	181,263	180,889	95,563	89,536	1,647,802	2,051,965
1890, . . .	246,626	255,343	173,473	170,102	2,655,237	3,028,131
1894, . . .	253,548	298,628	247,030	280,562	2,912,569	3,294,891
1895, . . .	237,748	300,451	367,738	399,891	3,064,557	3,446,390

Exports at Boston for the Fiscal Year ending June 30, 1896.

1895, July,	. . . . .	$7,055,404
August,	. . . . .	6,239,500
September,	. . . . .	6,195,283
October,	. . . . .	8,914,803
November,	. . . . .	7,861,691
December,	. . . . .	9,374,803
1896, January,	. . . . .	9,045,196
February,	. . . . .	7,314,483
March,	. . . . .	9,224,356
April,	. . . . .	8,264,843
May,	. . . . .	7,584,276
June,	. . . . .	8,776,366
		$95,851,004

Exports at Boston for Twelve Months ending Sept. 30, 1896.

1895, October,	. . . . .	$8,914,803
November,	. . . . .	7,861,691
December,	. . . . .	9,374,803
1896, January,	. . . . .	9,045,196
February,	. . . . .	7,314,483
March,	. . . . .	9,224,356
April,	. . . . .	8,264,843
May,	. . . . .	7,584,276
June,	. . . . .	8,776,366
July,	. . . . .	8,036,999
August,	. . . . .	7,769,402
September,	. . . . .	7,880,718
		$100,047,936

Exports from Boston to Liverpool by the Warren Line of Steamships during the Year 1895.

Agricultural goods, packages,	5,195
Apples, barrels,	67,389
cases,	260
Asbestos, bags,	1,000
Bark, bundles,	10
Beef, quarters,	209,936
Beeswax, cases,	149
Belt dressing, packages,	83
Belting, bundles,	2
Bicycles and parts, packages,	114
Blacking, packages,	2,544
Blocks, crates,	711
pieces,	72,129
packages,	928
Bones, bags,	317
Books, packages,	19
Brass, packages,	44
barrels, old,	7
hogsheads, old,	13
packages, old,	9
Brushes, cases,	12
Bungs, barrels,	598
Butter, boxes,	212
tubs,	82
packages,	175
Canned goods, cases,	28,472
Capstans,	13
Caramel butter, tubs,	25
Carriages and parts, packages,	8
Castings, packages,	478
Castors, packages,	12
Chair stock, packages,	63
Cheese, boxes,	86,521
Churns, packages,	17
Cigarettes, cases,	4
Clover seed, bags,	60
Cocoanuts, bags,	1,813
Conduit, coils,	31
Confectionery, packages,	166
Copper, bale,	1
Corn meal, sacks,	20
barrels,	5
Cottolene, packages,	1,350
Cotton, bales,	139,680
bags,	325
Cotton-seed, sacks,	7,889
oil, barrels,	1,433
Cranberries, boxes,	201
crates,	50
Crayons, cases,	279
Crucibles, barrels,	97
Cutch, boxes,	100
Cutting-blocks, packages,	76
Desks, cases,	911
Domestics, bales,	1,128
cases,	391
packages,	523
Drills, cases,	30
Duck, bales,	50
bolts,	498
Duck, rolls,	40
packages,	17
Dyestuffs, barrels,	6
Effects, packages,	5
Eggs, cases,	2,786
Electro-plates, boxes,	27
Emery cloth, packages,	22
Emery wheels, packages,	20
Empty packages,	10,263
Extract, barrels,	945
Feathers, bales,	57
Fish, drums,	335
packages,	324
Flaxseed, sacks,	142
Flour, barrels,	926
sacks,	255,602
Furs, bales,	82
Glucose, barrels,	2,370
Glue, barrels,	5
Grain, barley, bushels,	9,860
corn, bushels,	2,060,720
wheat, bushels,	2,680,169
Grape sugar, bags,	3,000
Hair, bales,	4,963
Handles, packages,	4,631
Hardware, packages,	410
Hay, bales,	30,974
Heaters,	34
Hemp, bales,	4,600
Hides, dry, bales,	151
green salted, bales,	73
bundles,	1,923
Hominy, barrels,	3
Hoofs, bags,	368
Hops, bales,	820
Horns, bags,	56
Horn tips, bags,	2,803
Household goods, packages,	514
Indigo, chests,	45
Iron pipes, packages,	897
Knives, cases,	30
Lamp-black, barrels,	113
Lard, barrels,	250
half barrels,	12,351
boxes,	12,933
cases,	1,622
crates,	50
firkins,	6,455
pails,	231,326
tierces,	25,313
Leather, finished, bags,	42
bales,	11,229
bundles,	2,492
cases,	1,507
rolls,	45,614
rough, bales,	1,171
bundles,	9
scrap, bags,	26,786
bales,	156
barrels,	259

Exports from Boston, etc. — Concluded.

Leather, scrap, bundles,	40	Rope, coils,	4
cases,	325	Rosin, barrels,	5,950
casks,	3	Rubber goods, packages,	903
rolls,	7	Rum, barrels,	145
sole, bales,	4,328	hogsheads,	477
cases,	7	kegs,	25
rolls,	236	puncheons,	120
remnant, rolls,	29	Sand, barrels,	12
Leather goods, packages,	43	Sand-paper, packages,	510
Live stock, calves,	121	Scales, cases,	18
cattle,	47,628	Sewing machines,	3
sheep,	67,446	Shoes, cases,	1,529
Logs,	723	Shoe goods, packages,	83
Lumber,* bundles,	13,782	Shooks, packages,	36
pieces,	185,312	Sieve rims, crates,	20
Machinery, packages,	1,780	Skins, bales,	6
Match blocks, pieces,	2,144	casks,	13
Medicine, packages,	154	Soap, packages,	1,350
Metal, packages,	1,243	Sodium, barrels,	33
Miscellaneous, packages,	503	Sponges, packages,	5
Missionary goods, packages,	13	Starch, barrels,	500
Mutton, carcasses,	550	Staves, pieces,	427,399
Nails, cases,	216	Steel rollers,	4
Nickel matte, casks,	66	Stove polish, boxes,	79,235
Oatmeal, boxes,	8	Sugar, bags,	1,500
sacks,	12,630	Sugar meal, bags,	4,000
Oil, barrels,	2,359	Syrup, barrels,	202
tierces,	398	Tacks, packages,	959
lard, barrels,	50	Tallow, barrels,	3,448
palm, casks,	608	hogsheads,	135
Oil, red, barrels,	500	tierces,	1,146
Oilcake, sacks,	3,876	Tape, rolls,	56
Oleo-oil, tierces,	153	Tar, barrels,	374
Organs, cases,	441	Tobacco, cases,	14
Organ materials, packages,	17	hogsheads,	913
Paint, packages,	64	half hogsheads,	250
Paper, cases,	3	tierces,	90
rolls,	324	package,	1
Paper stock, packages,	10	Tripoli, barrels,	341
Photo-goods, cases,	8	sacks,	400
Pigs, carcasses,	5,118	Troches, cases,	190
Pitch, packages,	106	Washers, cases,	12
Poles,	3,240	Waste, bales,	4,005
Printed matter, cases,	1,423	Wax, bags,	25
Provisions, barrels,	4,340	barrels,	2,495
half barrels,	162	tubs,	56
boxes,	126,992	packages,	182
cases,	8,389	Whiskey, cases,	231
kegs,	45	Wire, packages,	75
tierces,	7,341	Woodenware, packages,	160
packages,	26	Wood pulp, bundles,	1,061
Prunes, boxes,	3,640	rolls,	664
Radiators, packages,	220	Woodwork, packages,	22
Rags, bales,	165	Wool, bales,	157
Rivets, kegs,	105	bags,	72
Rolled oats, barrels,	727	Zinc dross, barrels,	108
half barrels,	50	boxes,	2
boxes,	18,217	casks,	5

* Ash, gum, hickory, maple, oak, pine, poplar, walnut, whitewood.

Cargo of Steamship "St. Ronans," which cleared from the Port of Boston Nov. 5, 1896, for the Port of London.

Advertising matter, boxes,	30
Apples, barrels,	1,605
crates,	201
Bacon, boxes,	117
Beef scraps, cakes,	147
bags,	2
Beef, tierces,	75
Blowers, packages,	58
Bran, bags,	23
Brassware, case,	1
Butter, tubs,	182
boxes,	13
Canned beef, cases,	1,865
Cash carrier material, barrels,	14
Cattle, head,	525
Chair stock, cases,	10
Confectionery, pails,	100
boxes,	35
Corn, bags,	475
boxes,	400
bushels,	41,686
Dowels, bundles,	289
Duck, bales,	3
Eggbeaters, cases,	12
Electrical machinery, case,	1
Flour, sacks,	9,830
Games, boxes,	2
Hams, boxes,	225
Hay, bales,	813
Horses,	57
Lard, half barrels,	500
tubs,	1,700
pails,	500
Leather, cases,	33
bales,	40
bundles,	186
Leather, rolls,	50
bags,	397
Leather board, cases,	6
Lumber, boxes,	2
pieces,	8,007
Machinery, cases,	6
Mahogany, pieces,	2,836
Medicine, boxes,	315
Oatmeal, bags,	250
Oats, bags,	31
bushels,	19,679
Organs, boxed,	27
Paper, cases,	48
rolls,	79
Printing machinery, packages,	12
Shoe black, crates,	100
cases,	10
kegs,	10
barrel,	1
boxes,	10
Shoe machinery, packages,	21
Shoes, cases,	107
Skates, cases,	14
Soap, boxes,	27
Starch, barrels,	6
Stock, furniture,	71
Straw, bales,	26
Syrup, barrels,	250
Tacks, boxes,	12
Tallow, package,	1
tierces,	40
Thread, cases,	2
Tongues, barrels,	10
Type, boxes,	15
Woodenware, cases,	15

Cargo of Steamship "Armenian," which cleared from the Port of Boston Nov. 3, 1896, for the Port of Liverpool.

Alarm tills, crates,	24
Apples, barrels,	18,157
Bacon, boxes,	2,610
Beef, quarters,	3,760
Boots and shoes, cases,	6
Cattle, head,	799
Confectionery, crates,	50
Corn, bushels,	30,378
Corn-flour, bags,	400
Cotton, bales,	5,730
Cotton-waste, bales,	229
Desks, cases,	49
Drills, bales,	106
cases,	150
Dry goods, box,	1
Ear-corn, bags,	600
Empty cases,	16
Flour, sacks,	955
barrels,	175
Hay, bales,	1,126
Lard, pails,	3,139
half pails,	250
boxes,	50
barrels,	35
Leather, rolls,	574
packages,	206
bales,	37
cases,	10
Organs, packages,	16
Pork tongues, barrels,	20
Provisions, bundles,	36
boxes,	230
Rolled oats, sacks,	17
Rubber-thread, cases,	11

Cargo of Steamship "Armenian," etc. — Concluded.

Rum, barrels,	100	Tallow, barrels,	14
Starch, barrels,	30	hogshead,	1
Stoves, case,	1	Tongues, boxes,	10
Straw, bales,	58	Wheat, bushels,	111,377

Cargo of Steamship "Pavonia," which arrived at the Port of Boston Nov. 25, 1896, from the Port of Liverpool.

Ale, casks,	11	Machinery, cases,	87
Bleach, casks,	26	Mackerel, barrels,	401
Books, cases,	13	Manganese, casks,	48
Brandy, cases,	500	tons,	12
Bronzes, cases,	2	Music goods, case,	1
Caustic soda, drums,	480	Oranges, cases,	88
Clay, casks,	550	Paintings, cases,	2
Clocks, case,	1	Paper, cases,	7
Clothing, case,	1	Periodicals, cases,	7
Coal work, casks,	24	Plants, cases,	14
Crockery, crates,	102	Rat traps, cases,	55
Dry goods, cases,	41	Rubber, packages,	91
Ebony, logs,	85	Sardines, cases,	429
Emery ore, tons,	300	Seed, case,	1
Figs, boxes and cases,	267	Shawls, cases,	3
Fish hooks, cases,	3	Sheep's guts, casks,	34
Floor cloth, cases,	3	Silverware, case,	1
Furniture, cases,	25	Skins, casks,	202
Gloves, cases,	3	prepared, cases,	2
Golf sticks, case,	1	Soda, cases,	5
Grapes, barrels,	127	Statues, cases,	9
Hardware, cases,	2	Steel, cases,	8
Hide cuttings, casks,	303	Sumac, casks,	75
Horn piths, packages,	40	Tin, boxes,	886
combs, cases,	2	Vegetables, cases,	50
Indigo, cases,	2	Walnuts, bales,	25
Iron, bars,	994	Wine, cases,	380
Iron bedsteads, bundles,	378	Wool, bales,	120
Lace goods, cases,	9	Woollens, cases,	5
Linens, cases,	3		

A Dry Dock.

The omissions affecting the growth of a port may be quite as important as the wrong-doings. Attention is therefore invited to further improvements, in which the aid of the Federal government will have to be obtained before they can be carried out.

No discussion of maritime and commercial wants here would be complete without a reference to the inadequacy of the present dry-dock accommodation. Every port abroad of any

consequence has at least one dry or graving dock, and at all the leading British and continental sea-ports there are many, — as at Liverpool, where there are twenty-four, and at Antwerp, where there are ten. Some of them are small and some large, the largest of all, nine hundred feet long, being at Glasgow.

That a port of the size and character of Boston ought to maintain ample dry-dock accommodation cannot admit of question; but that it does not, and is not likely to for the present by individual enterprise, is also unquestionable. Were it not for the presence of the Navy Yard, some doubt might exist as to the best method of treating this subject; but, as it is, there would seem to be but one proper thing to do, and that is, to request the Federal government to build a dock of proper dimensions at the Navy Yard. The North Atlantic squadron can have no better place for docking and repairing than at this port, whether the growing navy is for the purpose of making or of avoiding war. The war vessels assigned to cruise off the North Atlantic coast ought not to have to rely on the foreign port of Halifax in case of disability, nor yet be obliged to run south of Cape Cod to a port for repairs.

Upon the occasion of the visit of the Committee on Rivers and Harbors of Congress to Boston last spring, a call was made at the Navy Yard at Charlestown, and a location examined most admirably adapted for a dry dock of the required dimensions. It lay contiguous to the present dry dock, the pumping machinery of which could be utilized for a similar service towards the new dock. The basin that would be required is already partially excavated, and here the government could establish the needed dock at a minimum of cost.

Whenever occasion occurs for using the dry dock recently built by the government at Port Royal, S. C., workmen, material and even machinery have to be forwarded some seventy-five miles from Savannah before any substantial re-

pairs can be made. Here at Charlestown, however, with depth of water sufficient to float the deepest battleship, would be found an army of skilled workmen, ready at a day's notice to use the splendid but — until the order of the Navy Department in November last — hitherto idle equipment with which this yard is amply furnished, and repairs of any description could speedily be made at the smallest cost.

We recommend the passage of a resolution asking our Senators and Representatives in Congress to urge upon the Federal government the desirableness of locating a dry dock at Charlestown, which might under suitable regulations be opened to the public for the largest vessels when not in use by the navy.

Anchorage Grounds.

The subject of adequate anchorage grounds near the wharves is of growing importance. At present they are located on both sides of the main channel, the one being adjacent to Bird Island flats and the other lying off the mouth of Fort Point Channel near the Commonwealth's South Boston flats. These areas are not deep enough at present for large steamships and other deep-draught vessels, which, when not going to berth, are obliged to drop anchor in mid-stream, in the path of navigation. Even now these grounds are not infrequently overcrowded, and it cannot be long before anchorage on the south side will have to yield to other uses.

The objections to requiring vessels to anchor farther than may be necessary from the wharves are too obvious to require discussion.

Bird Island flats lie between the main channel and the Governor's Island channel. Suggestions for the removal of these flats have several times been made. The unknown effect which such removal might have in the possible diversion of the flow of the waters of the upper harbor from the main

channel to the Governor's Island channel — the consequence of which might be disastrous and destructive to the improvements heretofore made in other parts of the harbor — is a sufficient reason for discarding, for the present, any such plan. But, on the other hand, the proposition for walling in an area on the crest of the flats and dredging a basin between this area and the main channel, in which ample depth could be readily obtained and the material dredged could be pumped over the walls, is not open to any serious objection. In carrying out this idea, not only would the present anchorage ground in that locality be more than doubled, but the way would be opened for almost indefinitely extending anchorage facilities, as increased use shall make necessary.

At Hamburg, Rotterdam, Amsterdam and other places abroad anchorage buoys are so located as to be convenient moorings for vessels, and are so arranged that vessels shall moor by stem and stern. The area usually required by each vessel for swinging with the tide when at anchor is thus reduced, and the allowance of space sufficient only to permit of boat service between them when moored greatly increases the field of anchorage. Adopting the foreign plan, a system of anchorage buoys, after excavating the required depth off these flats, could be arranged which would afford all the accommodation needed for years to come.

In the same manner, provision could be made at the easterly end of the filled South Boston flats, in the area lying between them and South Boston, for the fleet which usually lies off Fort Point Channel. A temporary basin could be excavated there, without interfering with the extension of the wharf frontage according to the existing projects for occupying the entire line from Fort Point Channel to the Reserved Channel, as from time to time increased dock and wharfage facilities in this locality might be needed. For it will be many years before such anchorage basin, if

constructed, would have to give way for wharf improvements, and during that time it will make a safe and convenient place for vessels to lie at anchor.

Water Basins and Waterways.

As has been pointed out, Boston is a natural outlet for the products of the north-western States and Canada. With these territories an established rail and lake connection has for many years existed through the lake ports and as far east as Montreal and Quebec. And it is thence, and not from the middle and south-west, that the trade must be chiefly sought in the future whereby to expand and increase the volume of the bulky shipments from this port.

It is upon the railroads that Boston must depend for its future growth and prosperity, as in the past. Their enterprise has built up the business of the port. But the same public spirit that led to the building of the Hoosac Tunnel, which has many times repaid its cost to the public, is needed to maintain the metropolis in her place as second for steamship tonnage within this country. Private enterprise, however, should now also be turned toward developing diversified industries at this port. Located advantageously to become a great manufacturing district, all the natural adjuncts should be carefully nourished. Not only do lines of railroad, well equipped to carry raw products to the mills, workshops and factories of every description, and bring back manufactured articles, radiate in all directions from Boston, but also water communication as well affords convenient access for landing raw material where needed, at the lowest cost. The export of manufactured articles should be increased, and new lines of ocean transportation with all parts of the world must be opened. With proper amendments to the tax laws which now tend to drive capital away from the Commonwealth, industries will be drawn hither, where the

products of skilled labor will find a ready market at the threshold of their home.

In the next hundred years the valleys of the Charles, the Mystic and the Neponset rivers should be filled with the noise of industry. And, while the purity of the water flow should be maintained, and all sewerage and deleterious matter be kept out, the banks of the rivers in their lower reaches, instead of being given over to pleasure, should be the places of unlading and embarking water-borne freights. Nowhere in the old world are such economic opportunities thrown away. The waterway, whether by river or canal, has been made useful for centuries.

France has 7,703 miles of rivers and canals used for traffic, and her admirable system has contributed largely to her commercial and industrial development. Large annual expenditures are continually made in improving and extending her interior waterways. Of Germany, similar truths may be stated, and, in addition, that nearly all the building materials of Berlin, Magdeburg and other cities were brought thither by canal. In Belgium there is more interior freight transportation by water than by rail. The greater part of the vast imports and exports of Hamburg, Rotterdam, Antwerp and other European cities are either received for shipment or distributed from the steamships by barges navigating far into the interior of the continent. The United Kingdom is cross-cut and interlaced with canals, having no less than 3,831 miles, with an average capitalization, excepting the Manchester Ship Canal, of about $31,000 a mile, and transporting annually in the neighborhood of 36,000,000 tons of freight.

While an appreciation of the value of the waterways was early shown in various parts of the United States, the building of railroads has of late years so far superseded and overshadowed them as to have led to their neglect. Recently, however, as the problems of economical transportation have

been receiving closer study, the canals are gaining more attention. The Erie Canal, to which New York is indebted for so much of her growth and prosperity, and which during many years was neglected, has lately been recognized as yet possessing the possibility of becoming again a valuable tributary to the port of New York, as well as of being an agency in developing the country through which it passes; so much so, that, notwithstanding serious opposition, the Legislature of New York in the session of 1894 authorized, subject to a referendum, an expenditure of $9,000,000 of public money for the purpose of deepening the bed and improving the locks of the canal, in order that it may meet the requisites of modern canal transportation in the transference of crops and merchandise. This action was ratified by popular vote at the next election.

While Boston has no tributary canals, yet all the sea-port towns on the New England coast, many of which are growing to be industrial centres, are tributary to the port by water as well as by rail. In addition, the southern ports, in connection by direct steamship lines, are adding largely to our exports, as well as being both consumers and forwarders of our shipments. Cheap and expeditious handling of coastwise vessels and their cargoes will perform the service for this centre in building up and developing the trade, without any additional cost for maintenance of the waterway.

After witnessing abroad earth excavations costing vast sums, with the result of creating far less than the bounty of nature has blessed this community with, this Board is prompted to record its warnings against encouraging any plans which might lead to the filling of South Bay, — a most useful and valuable basin for locating docks and wharves and terminal facilities, — and thus lessening the competition of water-borne with the land-borne freights.

Another point of view demands brief attention. As greater

Boston extends and fills up, congestion of traffic in business avenues will be unavoidable, becoming only a question of degree. Therefore, the provision of other ways for transportation of merchandise must be a constant study, and wherever the waterway can be used, it should be preserved. The objections to drawbridges and consequent delays are largely of degree, and are usually more than compensated by the benefit conferred upon the cause of the interruption to travel.

In Hull, Amsterdam, Rotterdam, Hamburg, Havre and elsewhere the interruption to business by raising drawbridges in main thoroughfares is considerately borne, and the prosperity of those places is evidence tending to show no serious injury resulting therefrom.

Here, however, it is to be hoped that the raising of all bridges to the height necessary to give a clear barge way between the under side of the draw and mean high water is only a question of time, and then, as drawbridges disappear, along with mastless vessels, the waterways will be preserved and used without interruption to travel.

The cheapness of the cost of manufactured articles will establish here a status for successful competition in foreign markets. When the manufactures of the district become in considerable quantity exportable, then will begin the assembling of cargoes for shipment hence; diversified cargoes will lead to trade with many ports and to new lines of steamships running weekly to continental ports, and quick passenger liners landing passengers here by half a day and in New York by several hours earlier than the fastest passage direct to New York can be made.

Free Ports.

Personal inspection and inquiry were given to the free ports at Copenhagen and Hamburg.

The Copenhagen free port was determined upon early in 1891. It was opened to traffic in November, 1894. Its depth of harbor and accessibility to the shallow harbors of the Baltic are claimed to entitle it to a large business in the trans-shipment of goods. As yet, however, the figures showing the growth of its business have not come to hand, and it is perhaps too soon to expect satisfactory returns. We trust it will realize the expectations of its projectors at Copenhagen.

The conditions at Hamburg are very different from those at Copenhagen. It lies where transportation by river barges, that cheapest of all methods of distributing products, terminates and ocean navigation begins, and becomes, therefore, a natural point of trans-shipment.

On entering the customs union in 1888, Hamburg insisted upon retaining her old-time rights as a free port, and a section of twenty-five hundred acres of the city and harbor was laid out and wholly separated from adjoining territory, and therein are located docks, quays, warehouses and factories.

The objects sought to be accomplished were the adaptation of the new port to such changes as the entry into the customs union might naturally bring about in the trade and commerce of the city. As the people of Hamburg were thereafter to be required to pay duties on imports, the character of the importations was liable to change. Consequently, to meet any loss of commerce in this direction, the accommodations and facilities of the free port were established upon the most liberal scale, with the hope, since realized, that it would thereby become a vast *entrepot* for goods, to await sale, reshipment or manufacture. The success of this free port is as much,

if not more, owing to the character and enterprise of the merchants as to the facilities there offered.

Bremen also has been a free port from time immemorial, and, like Hamburg, joined the customs union in 1888. A portion of its territory has been separated and surrounded by a customs patrol, within which is included a large warehousing district, as well as docks, quays and ample wharfage accommodation.

The propriety of establishing a free port at Boston has apparently engaged public attention somewhat of late, and this commission has taken the subject under consideration. With reference to establishing free ports in this country, however, it may be well to call attention to the fact that all importations may go into United States bonded warehouses and be exported without liability to pay any import duty. There are, nevertheless, imported articles on which duties are paid, the character of which has been changed by manufacture. But on these, when exported, under rules and regulations of the treasury department, a rebate of ninety-nine per cent. of the duty is allowed. As, for instance, a rebate is allowed of the duty on the tin plate in the cans containing kerosene oil exported from this country; a rebate is allowed of the proportionate part of the duty collected on molasses, when dutiable, to the exporter of the rum, when he can show that the rum was manufactured from the residuum of the molasses left after boiling for sugar; a rebate is allowed of the duty when paid on imported lumber of which the boxes in which bacon is exported are manufactured.

It is not assumed that these examples cover all cases, as there are doubtless many instances in which it would be impracticable to so separate the value of the imported article in the manufactured product as to justify a claim for rebate. The free port is a commercial problem in which the question

of cost in outlay and maintenance is to be balanced against the profits on the exported products.

In view, then, of the present system of bonded warehouses and of rebates on the dutiable raw material in manufactured articles to be re-exported, and of the great cost of building and maintaining a free port, after careful consideration the commission is inclined to the view that the method of procedure in actual use is better adapted to conditions here than the method in vogue in foreign countries. It is, however, conceivable that conditions may arise which would indicate the desirability of establishing, experimentally, a free port system in localities favorably situated for the purpose. In that case, some portion of the territory in Boston harbor might afford exceptional facilities for testing the value of such a means of stimulating exports of manufactures as would seem to have been successfully exploited at some European ports.

It has not been thought desirable to go into the details of the plans herein presented, for the reason that the determination of a policy with reference to the treatment of a great harbor must be reached on grounds quite independent of the arrangement of the manner of its development. Just enough, therefore, has been outlined to show the entire feasibility of adapting the unimproved harbor frontage to public ownership and control of wharves and docks, without any attempt at exhibiting the details of structures or excavations.

The inner harbor itself is wonderfully adapted for a most extensive expansion of wharf frontage and dock accommodation, as has been heretofore pointed out in the reports of the Harbor and Land Commissioners. It is the rate of the growth of demand wherein exists great uncertainties. If in time the increase of commerce and the experiment of public ownership and control shall justify, two faces of Bird

Island and the whole of Winthrop shore front as far down as Shirley Gut are available for acquisition and improvement.

Embraced by the shores of East Boston, Winthrop and Governor's Island lies an area a mile square beyond the lines of any possible pier heads. With the exception of its channels, this area is mud flats, for the most part exposed at low water, of a material easily and cheaply to be excavated, a considerable portion of it by pump dredging, all of which could be used in filling the adjacent wharves and territory thereto adjoining. Such a development would not only increase the wharf and dock accommodation, but would provide a fine anchorage basin, completely protected from winds and waves. It will be the function of the commission, however, having the future development of the public property and interests in charge, to formulate plans from time to time best suited to the wants of the port, as well as to devise ways to carry out the intent of the public under the large powers with which it is essential it should be invested in case the recommendations hereof shall be adopted.

In the prosecution of the work of this commission a large amount of material has been collected, including maps, plans, reports and statistics relating to the commerce and harbor improvement of all the sea-ports in the world; and as this material will undoubtedly be of value to the Harbor and Land Commission, we recommend that authority be given for a transfer of all the property in the hands of this Board to said commission.

The conclusions reached in the foregoing may be summarized as follows: —

Summary.

I. Public Ownership of Foreshore. — That a portion of the foreshore should forever be preserved in the ownership and control of the people, for uses and purposes such as the

needs of changing conditions may from time to time require, but that it is neither necessary nor desirable that the entire foreshore of the harbor should be thus held; on the contrary, a diversified ownership is believed to be healthiest, and therefore the acquisition of certain parcels within the limits of the city of Boston, as hereinbefore described, is recommended.

II. Elimination of Extra Charges. — That the close competition in the commerce of to-day requires the study of economy in every element and detail of the problem of cost in transportation, the elimination of all separate items and the advantage of calculating and making through rates without the disturbing effect of extra charges; that the growth of the commerce of Boston during the past two decades has been mainly of such commodities and under such conditions as permitted the absorption of wharfage and other outside charges.

III. Public not Private Capital required. — That the needs of commerce require increased accommodation and facilities at this port, at the lowest rate of charges; that private individuals cannot fairly be expected to furnish these for such returns on investment as they would be willing to accept; that the uncertainty of immediate returns is against large outlays by private individuals; that private interests and not the public welfare is naturally and properly their first thought, and the making of this port a great commercial centre is a secondary consideration; that public welfare demands the largest volume of trade at the least cost, — low, uniform and stable charges, first-class equipment, ample accommodation and abundant facilities at the lowest charge to the user.

IV. Public Money Cheaper. — That public wharves, docks, landing sheds and equipment can be built with cheaper money by using the credit of the Commonwealth

than of individuals; that the charges to the user need be enough only to pay a low rate of interest on the cost, the annual disbursements for maintenance, repairs and a sinking fund sufficient to reimburse the original outlay in forty years.

V. Good Results. — That wise expenditures of public funds have been followed by good results abroad and elsewhere in this country, and there is no sufficient reason to doubt that similar results would attend a similar outlay here.

VI. Private Property Rights. — That the growth and adjustment of trade on natural lines is too sensitive and too liable to be upset and depart elsewhere to justify interference, even with the hope of benefiting it; that, therefore, the commission refrains from recommending interference with the ownership of improved private properties on the water front, but contents itself with recommending the acquisition of unimproved private property, and the improvement of public property on principles of systematic and uniform growth at such pace as needs may demand.

VII. Owners of Private Wharves not injured. — That the growth of local harbor, coastwise and warehouse business attendant upon the increase of the city will create constant demand for private wharves along the peninsular front, so that the owners thereof need have no fear of evil effect from public ownership as herein limited, nor need the railroad companies apprehend injury from that which is more likely to be to them an enduring benefit; the impetus to business of all kinds as a result of expanding the commerce of the port would more than offset any disadvantage to any private wharf owners from such building of public docks as is herein proposed.

VIII. Probable Cost. — That the plans proposed can be carried forward by an expenditure of less than a million

and a half of money, with distinct advantage to the port, to a point where further development may be delayed or cease without impairing the value of that which has been accomplished, and may be resumed at any time thereafter on the same or different lines, thus avoiding the inextricable complication of plans contemplating the expenditure of many millions before results could be achieved.

IX. Commonwealth Credit. — That the needed money be borrowed on the credit of the Commonwealth, for thus can the cheapest money be obtained.

X. How expended. — That it be expended in acquiring the foreshore hereinbefore recommended and in building a model dock on the Commonwealth flats at South Boston, and, when that shall be occupied, another, and then another, so long as the demand shall continue; and thus would the investment be conservative in time and amount, and always be represented by market value.

XI. By Whom. — That the powers of the Board of Harbor and Land Commissioners be enlarged; and, for the reasons hereinbefore stated, to it be intrusted all matters relating to the proposed improvements and the expenditure of the moneys.

XII. Oliver Street Bridge. — That the building of a new bridge across Fort Point Channel at Oliver Street, to connect with Northern Avenue, would provide for a rail connection between the Commonwealth flats property and the northern railroads by way of the Union Freight Railway, and incidentally remove a considerable amount of traffic from the path of people who will use the new southern union station.

XIII. Tracks at East Boston. — That the changes in railroad tracks and terminals at East Boston, suggested for

the purpose of eliminating grade crossings, are feasible, and as inexpensive as the nature of the problem will admit of, and are calculated to deal with the subject to the public satisfaction, in case nothing shall be accomplished under the provisions of Statutes of 1895, chapter 491.

XIV. Absorption of Wharfage Charges. — That it would be for the interest of the commerce at Boston if the owners of railroad and other private wharves, following the custom successfully established by the coastwise steamship lines at this port, would arrange, whenever possible, to have the wharfage charge included in the freight rate, so as not to appear as a separate item to the consignee or importer.

XV. Car Floats. — That the use of car floats between the railroad and steamship wharf terminals can be increased to great advantage, and thereby effect a substantial saving over the cost of transference by rail.

XVI. Switching Charges. — That switching charges made by railroads, when excessive, can be redressed by appeal to the Board of Railroad Commissioners.

XVII. Discrimination. — That discriminations within the jurisdiction of the Interstate Commerce Commission are not subjects of profitable discussion or recommendation in this report.

XVIII. Dry Dock. — That all proper influences should be used to induce the Federal government to build an adequate dry dock at the Charlestown Navy Yard.

XIX. Anchorage. — That the anchorage grounds in the upper harbor are insufficient, and that means should be taken to increase those at Bird Island flats, and provide others elsewhere.

XX. Water Basins. — That the Commonwealth should do all in her power to foster waterways and basins, wher-

ever they can be utilized, whenever in the interest of economy in transporting necessaries to the citizen.

XXI. Outlet for North-west. — That Boston is a natural outlet by way of the lakes for the great north-west. This has been made evident by the volume of exports brought here through the agency of the railroads, working in conjunction with their lake and ocean lines. Individuals and corporations, therefore, interested in our growth, should continue unremitting efforts in the direction of causing the products of that vast territory, as fast as it may be settled and developed, to seek ocean transportation through this port.

XXII. Free Port. — That it is the purpose of the customs laws, as interpreted by the United States treasury department, to enable manufacturers to realize many of the benefits of free ports as established abroad, but without more data than at present in the hands of the commission specific recommendations would seem to be inadvisable.

The commission embraces this opportunity to publicly express a deep sense of its obligations for the assistance it has received in every quarter in prosecuting its investigations, especially to the State and Treasury departments at Washington for the interest exhibited in forwarding the queries of the commission to the consuls abroad, and the unfailing courtesy ever accorded to all its requests; to the Chamber of Commerce, the Associated Board of Trade and the Merchants' Association of Boston, for their contributions to the information sought for; to the commissions, the boards, the chambers, consuls, merchants, officials and engineers the world over, for their ready responses with books, pamphlets, plans, letters and conferences; particularly for the generous aid and courteous hospitality extended to members of this commission when visiting the many ports at home and

abroad; and, last but not least, to the individuals who have appeared before the Board, personally and officially, and have given liberally of their valuable time and contributed freely of their invaluable information and experience to promote the objects of this inquiry.

WOODWARD EMERY.
J. R. LEESON.
CLINTON WHITE.

APPENDICES.

APPENDIX I.

REPORT OF THE ENGINEER.

REPORT OF THE ENGINEER.

To the State Board on Docks and Terminal Facilities.

GENTLEMEN: — I respectfully present the following report of those engineering features, with railroad connections, which, among others perhaps, seem to be naturally connected with the proposed system of public docks for the port of Boston.

About fifteen years ago Mr. James Alexander, then of the Cunard line of steamships, suggested the development of the East Boston flats, to which he gave the name of East Haven, and the building of a belt railroad. In accordance with this suggestion, surveys and estimates were made for a railroad, extending from East Boston through Revere, Chelsea, Malden, Medford, Somerville, Cambridge, Watertown, Brighton, Brookline, Dedham and Dorchester to South Boston, at an average distance from Boston of about five miles. It was about twenty-five miles long to a connection with the Old Colony Railroad. It was intended for a first-class double-track railroad, passed either over or under every highway and railroad encountered, connected with every steam railroad by spur tracks with grades of one per cent., and was estimated to cost $2,921,855, or an average of about $125,000 per mile. This is exclusive of land damages and incidentals. It was supposed at that time that land would cost not less than $1,000 per acre, or, for a right of way five rods wide, $10,000 per mile.

The maximum grade was one of 61.6 feet per mile between the Boston & Albany Railroad in Brighton and the Woonsocket division of the New York & New England Railroad in Brookline. Elsewhere there was no grade exceeding one per cent., and the maximum curvature was of six degrees.

Could this scheme have been accomplished, it would have connected every Boston railroad with every other one, as well as with terminals at East Boston and South Boston, and that without great increase of haul over delivery at the stations of the respective roads.

Since that time the business has crystallized into a more or less perfect system, under which each railroad has sought its own terminal location and fitted it up for its business in its own way, regardless of other railroads.

At the present time the New York, New Haven & Hartford Railroad seems to have settled down upon the South Boston flats. The Boston & Albany Railroad has selected East Boston, with which it has a connection by means of the Grand Junction Railroad. This is most unfortunate, for it crosses at grade most of the important streets in Cambridge, and all the freight and passenger tracks of the Fitchburg Railroad and the Boston & Maine Railroad, save those of the Lowell system which lead directly to Boston, but including those which lead to the Mystic River wharves. The Boston & Maine Railroad has terminals in East Boston, which it acquired through the Eastern Railroad, and others more extensive on the Mystic River, which came to it through its connection with the Lowell Railroad.

Under existing circumstances little can be done except to suggest slight modifications and changes which may perhaps improve the situation.

The New York & New Haven road may well be content, for it has easy access to its grounds, with the opportunity to purchase other grounds. The Boston & Albany is in the most unfavorable position, being between the other systems, and being obliged to cross one or the other of them in order to reach East Boston or South Boston.

The most radical but costly plan with regard to the Boston & Albany would be to tunnel under Fort Point Channel, beginning at Tremont Street in Boston and ending on the further or southeasterly side of the New York & New Haven Railroad. The tunnel would be, going *via* First Street, about six thousand feet long, including approaches of about eight hundred feet at each end, with grades of three feet in one hundred, or three per cent. It is estimated that it would cost for a single track about $2,000,000, and by its use all grade crossings and interference with passenger tracks would be avoided, and access obtained to the Commonwealth's lands in South Boston.

Another simple and economical method would be to build a short bridge across Fort Point Channel, just above the present Broadway extension bridge.

It would be about four hundred feet long, and is estimated for a single track. The tracks to connect it would leave the present Boston & Albany Railroad at Albany Street, and connect into the present tracks of the Old Colony Railroad, and by means of them into the tracks of the New York & New England Railroad by a connection recently built. Such a piece of road and the bridge can be built for about $50,000, and a double-track connection would not exceed in cost $85,000. This, however, involves the use of its own passenger tracks for freight, and the crossing at grade of the pro-

posed passenger tracks of the Providence Railroad division with freight trains.

Another addition suggested is a connection between the Boston & Albany Railroad and the Watertown branch of the Fitchburg Railroad. This connecting track would be about one mile long, and would require a bridge across the Charles River. It is on the site of the proposed belt railroad referred to, and passes through the grounds of the Watertown arsenal. If this location is not permissible, it can easily be changed to other land in the vicinity. The estimated cost for a double-track, first-class connection is $130,000, exclusive of land damages.

With such a connection built, and proper arrangements made with the Fitchburg Railroad, that part of the Grand Junction Railroad lying between Cottage Farm and its connection with the Fitchburg Railroad in East Cambridge could be abandoned altogether for through business.

This being done, that part of the Grand Junction Railroad lying between Cottage Farm and Broad Canal in Cambridgeport could be taken up, thus relieving four most important avenues connecting Cambridge with Boston, namely, Massachusetts Avenue, Main and Harvard streets and Broadway, from grade crossings, which have been almost unsolvable problems for years. It would also remove one bridge from the lower part of Charles River, and relieve the Cambridge and Brookline bridge of a bad grade crossing.

The other part of this road lying in Cambridge could be used as a stub, connecting with the Fitchburg Railroad at Bridge Street, and accommodating most of the manufacturing business of Cambridgeport and the butcheries of East Cambridge. Then, if a bridge be built at Cambridge Street, to avoid the present grade crossing at that point, this stub track could be operated with very little inconvenience or damage to public travel. It would be possible, even, to confine this business to the middle hours of the night or to early morning, and thus almost wholly eliminate the present delays and dangers connected with the operation of this railroad.

There is another possible and promising connection between the Boston & Albany Railroad and the New York & New England division of the New York & New Haven road. By leaving the Boston & Albany at a point between Wellesley and Natick, called Lake Crossing, a line could easily be built up the Charles River and Mother Brook to Hyde Park. It could be built with very easy grades, and cheaply, as there is much low and swampy land along those water courses not useful for any other purposes. It will require about thirteen miles of new road. A route very nearly the same is

alluded to in the late Rapid Transit Commissioners' report, and is there estimated to cost $600,000. (See pages 39 and 245.)

Hyde Park being eight miles nearer Boston than the point of departure of this line from the Boston & Albany, the additional haul would be reduced to five miles. Even with this increased distance here, the Boston & Albany could by this route reach the wharves in South Boston with one mile less of distance than it can now reach its East Boston wharves by the Grand Junction Railroad.

The Fitchburg Railroad is the most limited as to its terminal facilities. The Hoosac Tunnel docks and wharves cover but a small area, but its facilities are now so arranged that business can be done with great despatch and economy. There is no room for further docks and wharves at this location, except it can purchase part of the Navy Yard. It is not for the interest of Boston's business nor of Boston's harbor that this should be done, nor is it likely that the government will ever consent to part with it. This road is most unfortunately situated in the matter of grade crossings, as its freight trains cross at grade all the passenger tracks of the Boston & Maine Railroad system except those on the Lowell division, as also the bridges from Charlestown to East Cambridge and to Boston. The only apparent opportunities for the Fitchburg Railroad to dispose of its surplus of business is either to join with the Boston & Maine Railroad in the use of its Mystic wharf terminals, or with the Boston & Albany Railroad in the use of the Grand Junction Railroad to East Boston, or to establish a system of car floats. If the Boston & Albany should require the use of the Fitchburg Railroad tracks from Watertown for five and a half miles, it might reciprocate by granting similar use to the Fitchburg of the Grand Junction to East Boston for six miles.

It is of little interest to public travel whether the Grand Junction be maintained between East Cambridge and East Boston, or be given up. The important grade crossing at Cambridge Street in Charlestown is in the slow process of elimination by the building of a bridge. The next most important grade crossing on this line is that of the Newburyport turnpike in Everett. This cannot long remain without a bridge. There is but one other important grade crossing on this portion of the Grand Junction Railroad save those in East Boston.

Under a plan of Mr. Jackson, city engineer, by which it is proposed to abolish all grade crossings in East Boston except at Marginal Street, he places the new location of the Boston & Albany and Boston & Maine railroads alongside of the Boston, Revere Beach & Lynn Railroad, and proposes a new tunnel.

You have asked me if the Boston, Revere Beach & Lynn Railroad

location between its East Boston ferry slip and Trumbull Street were surrendered and assigned to the Boston & Albany and Boston & Maine railroads, whether there would be any engineering difficulties in rearranging the tracks and buildings of the two roads on their grounds between Marginal Street and the water. In accordance with this request two plans have been outlined, on which the tracks, freight houses and other accommodations of the two railroads have been rearranged with as little disturbance of present conditions as seems possible.

It should, perhaps, first be stated that the Boston, Revere Beach & Lynn Railroad is possessed of two tunnels, with a three-foot wall between them, and that each tunnel is thirteen feet wide and ample for steam railroad traffic of the standard gauge.

On account of the manner in which the Boston & Albany and Boston & Maine railroads approach East Boston, and the location of their respective grounds, it is unavoidable that the business of either road should cross that of the other at grade.

Under the first of the two plans referred to this crossing is done in detail in the yard south-west of Marginal Street, by means of a ladder crossing and connecting with all the tracks of both systems. Under the second plan, the crossing is done in full trains, somewhere east of the tunnels of the Boston, Revere Beach & Lynn Railroad, as at present. This must continue as long as the Boston & Albany Railroad has its freight terminals at East Boston on its present grounds, or until the Boston & Maine shall choose a new site.

I do not anticipate any difficulty in carrying out either one of the two plans referred to.

The Boston & Maine system has suitable facilities for its present needs at the Mystic wharves and at East Boston, and is in a position to reach such further deep-water facilities as may be called for in the future at East Boston, such as wider and longer piers, broader docks, with deep water sufficient for larger steamships.

The capacity of the railroads to do business from their present termini can be very much increased by setting up a system of car-float service. It is believed that this is the cheapest and quickest way of transferring cars. It does not involve any labor of importance, for the cars are not unloaded of their contents. The New York & New Haven road now has an incline at South Boston and the Boston & Maine one at East Boston. This system can be extended and made substantially sufficient for the present if the Boston & Albany railroad build one at East Boston, the Boston & Maine one at the Mystic, and the Fitchburg one at the Hoosac Tunnel docks,

where there is a questionable opportunity. The extreme distance for floats to be run would be about two and a half miles between Mystic and South Boston, while the average would be about one and a half miles. The cost of the standing plant, such as is in use in East Boston, would be about $20,000. The cost of a scow, or float, to carry eight long cars or ten short ones, would be about $12,000. The cost of the entire five inclines or standing parts would be $100,000, and of a float to each incline $60,000 more, or a total of $160,000. All of this would not be needed at once, but only as business and necessity demanded. They should all be made alike, so that floats could interchange anywhere at any time of tide. The interest on plant would be about $10,000 per year and repairs as much more, say about $20,000 per year for the five inclines, or $4,000 per year for each.

The transfer of freight at New York and Brooklyn by floats is necessary and efficient for two reasons. The Hudson River has to be crossed by all the business between the west and south and either of those cities, except such as the New York Central Railroad brings into New York City.

The other reason is that the moderate rise and fall of tides in New York harbor of three or four feet is favorable to the use of floats. They can be used at all stages of such tides. In Boston the tides range from eight to twelve feet.

The inclines in use at South and East Boston cannot easily and safely be used except between about half tide and high tide. This is an unfortunate limitation, and cannot easily be remedied except by an extension of the inclines by the addition of another span and floating tank with other machinery, at a cost probably of about $25,000 at each site. With the present conveniences, and use for one half a tide, however, two hundred cars can be transferred in a day between South and East Boston. If fifteen tons be taken as the average load of each of ten loaded cars upon a float, we have one hundred and fifty tons of freight as one float load. The cost of towing is taken to be $10, and is the same whether the tow is for a long or short distance, if it be in the harbor. The empty cars have to be returned, at another charge of $10. The transfer of one hundred and fifty tons, therefore, costs $20, or about 14 cents per ton. If the cars can be returned loaded, the cost will be reduced to 7 cents per ton. It is assumed here that floats carry full loads. In addition to the tug there must be a locomotive with five or six empty flat cars in attendance at each end for loading and unloading the float.

The length necessary for a half-tide plant is about one hundred and fifty feet and for a full-tide plant three hundred feet, and the breadth about fifty feet in either case.

One of the important questions in this discussion is as to the location of enlarged facilities in Boston harbor for steamships with proper connection with railroads, and near enough to the city to be convenient.

There seems to be a tendency to larger ships than heretofore, in order to cheapen the transportation of freight. It seems to be wise to choose new locations, where piers 1,200 feet long and 300 feet wide, with corresponding docks 275 feet wide, can be built. The location should be as near to other business of this sort as is possible, without destroying property now in existence and use, and where conveniences as to railroads and teams can readily be extended to the new work.

Our attention is at once directed to East Boston and South Boston. At the latter place the Commonwealth has done a large amount of work along the line of such improvement, and several piers and docks have there come into the possession of the railroads, either by purchase or construction. At East Boston the site suggested is in front of Jeffries Point, and extending into the bay easterly of this point.

A rumor got about that the foundations back of Jeffries Point were very bad for the construction of such works as are proposed. It was deemed unsafe not to heed such rumors, and therefore other soundings have been made. Six borings made south and south-east of Jeffries Point, and about half a mile from shore, showed a crust of mud, sand, gravel and stiff blue clay under the flats, extending down to an average depth of about twenty feet below mean low water. Below this crust there was found a soft blue clay extending down to eighty and one hundred feet below mean low water, before hard bottom was found. Then followed the question, can such works as are proposed be built upon such foundations. It is proposed to excavate docks having thirty-three feet of water at mean low water, in order to be sure to have thirty feet at extreme low water. It will be seen that such a dock must be cut down thirteen feet into this soft blue clay.

It was known that the Boston & Albany Roilroad had had some experience with unstable foundations at their yards in East Boston. It was therefore determined, by permission, to make some borings there, and two were made, one on each side of their grain elevator. It was found here that there had been no crust, or that it had been removed. Soft blue clay was reached in one case at twelve feet and in the other at nineteen feet below mean low water. Hard bottom was reached in one case at sixty-three feet and in the other at seventy-nine feet below mean low water. This experience proved that such works could be built upon such foundations safely, though

at increased expense. The dock alongside of this elevator has twenty-seven feet of water at low water, and the sides of the excavations do not seem to cave in, though excavated into this soft blue clay for a distance of fifteen feet.

The next question suggesting itself was, shall East Boston be abandoned, as too costly, in favor of South Boston, which seemed to be better. It was therefore suggested that some borings be made at South Boston, and two were made. One was made at about where the next pier south-easterly from Pier No. 4 would be likely to be built, and about the centre of it, and the other in the dock adjoining, south-easterly of this proposed new pier, and near its centre.

The first boring showed a crust consisting of strata in the following order: mud, sand and shells, sand and silt, silt and peat very soft, and hard, firm silt and clay, down to twenty-four feet below mean low water. At this point soft blue clay like that at East Boston was struck, and continued down to one hundred and five feet six inches without reaching a bottom.

At the other boring the same veins of silt, peat and shell were passed through, and a stiff blue clay was reached at twenty-five feet six inches below mean low water. At thirty-one feet soft blue clay was reached, like that at East Boston, and boring through it, was continued down to one hundred and seven feet without reaching a harder bottom. The three-foot vein of very soft silt and peat is more objectionable than anything found in East Boston.

It seems, therefore, that there is very little choice between East and South Boston. They are about equally accessible by teams, tugs and lighters. It is not likely that a better and cheaper site for building can be found in Boston harbor without sacrificing some of the conveniences of the two places suggested.

Respectfully,

THOMAS DOANE.

APPENDIX II.

LETTERS OF HENRY W. PEABODY, JENNESS BROS., G. S. GREENE, JR., WM. F. WHEATLEY.

LETTER FROM H. W. PEABODY.

HENRY W. PEABODY & CO.,
SHIPPING EXPORT AND IMPORT COMMISSION MERCHANTS,
BOSTON, Dec. 9, 1895.

WOODWARD EMERY, Esq, *Chairman State Board on Docks and Terminal Facilities, Boston, Mass.*

DEAR SIR:—Apropos of my testimony before your committee in regard to the present insufficient wharfage and dockage facilities at this port for vessels other than those of regular lines, I beg to call to your attention the case of the steamer "Blackheath," arrived here this morning with a cargo of 7,236 bales of sisal to my firm's consignment. We desired to store 5,000 bales and to ship off the balance, and have been working for the past week to secure a berth for the steamer, and found it impossible to accommodate her at any wharf in the harbor below bridges. We interviewed New York & New England, Boston & Albany, Hoosac Tunnel, National Dock and Warehouse Company, Fiske, Constitution, Lewis, Union and Long wharves. Six of these wharves could not even offer a berth at which to discharge. One could provide room to discharge 2,000 bales, but could store nothing; and there was so much other merchandise on the dock that no insurance was possible upon that cargo discharged. One could allow us to discharge 2,500 bales, of which they could store 1,500 bales, and one could store 2,500 bales, but had no stages with which to discharge the boat, nor could the steamer be worked except at certain positions of the tide. She could not, therefore, be discharged at any or all of the above-mentioned docks, should she be sent to each of them in turn. Mystic wharf could store nothing, but offered to provide us a berth for discharging a greater part of the cargo, providing we would pay double the wharfage rates asked by the others. The only other alternative to us was to send her up to Boston wharf through the bridges. The New York & New England refused to authorize us to send any boat through their railroad draw of more than forty-one feet beam, and the "Blackheath" is forty-one feet six inches. We, however, succeeded in getting her through by the aid of two tugs, although she scraped in so doing.

Had this steamer, then, been of one or two inches more beam, she could not have been discharged in all Boston harbor, and storage provided for the greater portion of her cargo, even though we had a week's time in which to arrange for a berth; and yet some of the warehouse people testified before your committee that Boston has at present ample facilities for all the commerce that might come to this port.

Boston as a hemp centre has been growing very rapidly. The broker's circular of December 1 reported 18,694 bales of manila hemp afloat for New York and 45,048 bales afloat for Boston; but it is obvious that, if proper wharfage and storage facilities cannot be provided in Boston, the speculators and western manufacturers will insist on their future purchases being diverted from Boston to New York.

Yours truly,

HENRY W. PEABODY.

LETTER FROM JENNESS BROS.

JENNESS BROS., TRUCKMEN,
27 MATTHEWS STREET, BOSTON, Aug. 23, 189b.

CLINTON WHITE, Esq., *State Board on Docks and Terminal Facilities, Boston, Mass.*

DEAR SIR: — Yours of August 22 duly received. The information you have received in reference to the scarcity of storage is correct. The warehouses are completely filled, and we find it almost impossible to get them to receive wool from our teams.

We have at the various freight terminals of the city at the present time over two thousand packages of wool which we are holding back, waiting for the warehouses to make room to receive them.

One reason for this is the unusual amount of foreign wool imported this year and arriving at the same time of the arrival of the domestic wools. There is very little (in comparison) going out, as the market is quiet, so the result is that everything is blocked up at present.

Yours truly,

JENNESS BROS.

LETTER FROM G. S. GREENE, Jr.

DEPARTMENT OF DOCKS,
PIER A, FOOT OF BATTERY PLACE, NORTH RIVER,
OFFICE OF THE ENGINEER-IN-CHIEF, NEW YORK, Nov. 4, 1895.

WOODWARD EMERY, Esq., *Chairman State Board on Docks and Terminal Facilities, Boston, Mass.*

MY DEAR SIR: — It seems to me obvious that it is most desirable that commerce should be put to as little expense as possible in regard to port charges, wharfage and dockage; that, as ports, wharves and docks require a large expenditure of money to furnish and provide them, the cheaper the money expended upon them the less the port charges, wharfage and dockage can be and afford satisfactory returns.

The cheapest money is that of the State, therefore its money should be used to provide ports, wharves and docks. If private interests build, own and control ports, wharves and docks, they not only are built with high-priced money, and therefore necessitate high port charges, wharfage and dockage, but private interest always demands the greatest possible return for its money, and is ever striving to put upon commerce, or traffic over its property, all the charges it can possibly bear in the way of wharfage and dock charges.

Selfish interest would doubtless oppose public docks in a port where there are private docks, lest competition should perhaps injure the private interests; but the people and the public, the vast numbers of producers and consumers, would certainly be benefited by low port charges, wharfage and dockage.

It seems to me, also, very desirable that you should first adopt or reject the above. If you reject it, then the matter would drop. If you accept it, then you are ready to proceed with propositions as to what should be done.

Possiby, however, you may desire to consider what can be done, if you accept the above, before accepting it. In that case, you have a large field before you.

Very truly yours,

G. S. GREENE, Jr.,
Engineer-in-Chief.

LETTER FROM WM. F. WHEATLEY.

THE BALTIMORE CORN AND FLOUR EXCHANGE,
CHAMBER OF COMMERCE BUILDING,
OFFICE OF THE SECRETARY, BALTIMORE, July 16, 1895.

Mr. CLINTON WHITE, *State Board on Docks and Terminal Facilities, Boston, Mass.*

DEAR SIR: — Your esteemed favor of 28th ult. reached me in due season, and its contents have been carefully noted; and replying thereto I beg to submit: —

Under authority of the State of Maryland, the mayor and city council of Baltimore control the building of all wharves. They are now governed by the lines laid down by the United States Advisory Board of 1876 as to their extension into the harbor. The water front of main harbor, measured on pier-head line, exclusive of United States property at Fort McHenry and at Lazaretto Point, is 32,200 linear feet. About 1,500,000 square feet between bulkhead and pier-head lines is occupied by wharves. The Baltimore & Ohio Railroad owns or controls 3,000 feet of front on pier-head line and the Northern Central (or Pennsylvania Railroad) about 1,200 feet.

As to the question of private ownership, I am clearly of opinion that private ownership of wharf property is not so advantageous to a community as ownership by the city and by the railroads. The latter naturally push all their energies towards developing their carrying business, and utilize their water-front property chiefly to that end, profit upon their wharf property entering but little into their calculations.

The city can make a uniform and low rate, and throw its wharves open to every one, while private owners are apt to use such property for their own business only, charging to competitors a rate in excess of what they ought to pay.

As to legislation affecting the ownership or regulation of the water front, or publications that give the area of docks and wharves, this

office has no information, and I am therefore unable to advise you. But I am sure that an inquiry directed to His Excellency Frank Brown, governor of Maryland, or Hon. Ferdinand C. Latrobe, mayor of the city of Baltimore, will receive a prompt and affirmative response.

Very respectfully,

WM. F. WHEATLEY,
Secretary.

APPENDIX III.

REPLIES TO CIRCULAR LETTER, AND INFORMATION FROM OTHER SOURCES REGARDING FOREIGN PORTS.

REPLIES TO CIRCULAR LETTER, AND INFORMATION FROM OTHER SOURCES REGARDING FOREIGN PORTS.

The following circular letter was prepared by the Board and forwarded to United States consuls, harbor boards, port officials, merchants and individuals at the world's principal sea-ports. Owing to rules governing the consular service, instructions were sent by the State department at Washington to the consuls, requiring replies to be made direct to the department, all of which were immediately forwarded here for perusal and the making of copies. The publication of all the reports would make an unwieldy volume, consequently those only have been printed which will afford the most information on the questions under consideration, and even these have been partially condensed. It is fitting here for the Board to record due acknowledgment for the unvarying courtesy and great consideration of the State department.

BOSTON, June 1, 1895.

This Board is constituted, as by the enclosed statute more fully appears, to inquire if the public ownership or control of docks and wharves in Boston is likely to prove advantageous to the public welfare. Information as to the extent to which the same has been adopted elsewhere, the reasons therefor and the results therefrom, will be a manifest aid in solving the problem.

Increased facilities in any one port are helpful to the world's commerce, and it is from this point of view that the great favor of a reply to the following queries is requested: —

1. To what essentials do you attribute the success of your port in competition with other rival ports?
2. To what extent do the physical features of your harbor enter into its success?
3. To what extent do the management and control of the docks, wharves or quays affect its success?

4. To what extent does the ownership of the docks, wharves or quays affect its success?

5. Is the ownership or control public or private, either wholly or partly; and, if partly, what is the mode of participation?

6. If the use of the docks, wharves and quays is regulated by a board of control, in what manner is it appointed or elected? What are the rules and regulations? Will you enclose a copy?

7. Have private ownership and control of docks, wharves and quays at your port been interfered with by State or municipal authority; and, if so, for what reasons and under what legislation, if any; and to what degree have the results been beneficial, or otherwise?

8. What commercial advantages, if any, does public ownership give over private ownership of docks, wharves and quays?

9. If public ownership exists, state the terms arranged for the satisfaction of former owners, and how and at what rates were the needed funds secured?

10. Does the principal part of the revenue of the docks or quays come from charges on the vessels, or the cargoes, and which pays the landing charges?

11. Have you direct railroad connections with your docks or piers from main lines, so that vessels can discharge and receive freight direct from trains?

12. Have you a local railroad connecting main lines with docks? If so, by whom is it owned and controlled? What is the basis of its tonnage charges or freight rates?

13. How much of your success do you attribute to your railroad connections?

14. Have you any system of lighterage at your port, and what are its advantages and charges?

15. What terminal and distributing facilities does your port possess over other comparatively similar ports?

16. Have you knowledge of any port where public funds have been used to build docks and other terminal facilities, and the expenditure has, or not, been warranted by results?

17. What is the chief staple of the traffic at your port?

18. Have you any information in the line of the foregoing inquiries, other than that which you have already given? If so, will you please state it generally or specifically, as is convenient?

ANTWERP (Belgium).

[Condensed statement.]

Antwerp, the principal port of Belgium, is situated on the river Scheldt, about 60 miles from its mouth, where the river is about 1,500 feet wide and 30 feet deep at low water, thus affording ample accommodation for the largest class of vessels.

The banks of the river are made available by the construction of a quay, alongside of which vessels drawing 28 feet of water can load and discharge. Upon this quay are sheds 150 feet in depth, connected by four lines of railway tracks with the railroad terminals of the port.

There are also ten floating, or wet, docks, comprising a quayage length of 33,500 feet and a water area of over 2,000,000 feet, excavated out of the solid earth, beside which there is a large dock for the accommodation of lighters and smaller craft, which traverse the canals leading into the interior and carry in the course of a year an enormous amount of freight.

These docks are admirably fitted up with the latest appliances for the rapid handling of cargoes at a minimum cost. Ample storage facilities are provided and all docks have complete railway connections.

There are ten dry docks at Antwerp, the largest of which will accommodate vessels 425 feet in length.

Up to the present time there has been expended on the public works in connection with the dock system at the port about $25,000,000.

The control and direction of the port are vested in the city council, composed of thirty-one members. The immediate supervision is in the hands of officers responsible to the council, on the same general lines as public works in this country are managed.

Port charges, lighterage, pilotage and all other expenses attending the shipping business are fixed by the management, and have been changed from time to time to meet the competition of rival ports.

The railroad facilities at Antwerp, and, in fact, of all Belgium, are of the first order. A majority of the lines are

owned by the government, and all of them are under government control.

Belgium is traversed by two large rivers, the Scheldt and the Meuse, beside several smaller ones and a number of canals. The heavy and coarse goods, like lumber, iron, grain, cotton, etc., are largely transported by water.

Antwerp is in reality supported by its great transit business; its direct importation represents but a small proportion of the business of the port.

A general idea of the volume of business is given in the following table, showing the number of arrivals and the total tonnage of the vessels during the last ten years: —

YEAR.	Number of Vessels.	Total Tonnage.	YEAR.	Number of Vessels.	Total Tonnage.
1885, ...	4,860	3,492,934	1890, ...	4,532	4,517,698
1886, ...	4,726	3,521,229	1891, ...	4,461	4,693,238
1887, ...	5,022	3,801,952	1892, ...	4,321	4,500,091
1888, ...	4,823	3,974,320	1893, ...	4,418	4,692,211
1889, ...	4,356	4,050,549	1894, ...	4,640	5,008,983

In regard to the ownership of docks and wharves at Antwerp, the following is from a letter of Mr. G. Royers, chief engineer of public works: —

So far as I know, private ownership does not exist on the continent; in regard to wharves, quays, etc., these are held by the authorities for the benefit of the public.

The coast line, the navigable streams and rivers, all belong to the government and are under its control. Permission is never accorded either to private firms or to public companies to exploit these for their own particular ends or benefit. In all such matters public utility and public convenience alone are taken into consideration. Not only is a navigable river nearly always appropriated to the public service, but the bank, or towing path, is likewise regarded as being government property. Therefore, speaking generally, it may be said that private ownership does not exist here, either in regard to the stream itself or to the land immediately adjacent thereto. For the same reason, pri-

vate ownership in docks, wharves, quays, etc., here is unknown, and this could not be otherwise.

It might happen that a concession for the appropriation of land, either riparian or on the sea-coast, might be granted by the government to individuals. But this is rarely the case; and, in fact, I know of none which have been important or which have met with success. I recall, however, one such concession, which was made in a neighboring country. It was for the construction of a canal from Amsterdam to the North Sea, with a port at Ymuiden, and docks, basins, etc., at Rotterdam (Feyenvord), on the left bank of the Maas. This enterprise wholly failed, and the whole of the works reverted to the Dutch government and to the city of Rotterdam respectively.

The reason why private enterprise, based, as it is, on a temporary concession and working with a fixed tariff, does not find favor here, is doubtless due to the fact that it has invariably to compete against governmental tariffs. The French, Dutch, German, Italian and Spanish sea-ports are in the hands of public authorities, who are the owners of the land and who administer the revenues. There is competition between the ports themselves; and, of course, private competition is wholly out of the question. In fact, as I shall presently show, the authorities have not only the means of raising the capital necessary for the execution of public works at a lower rate of interest, but whenever they see fit, and invariably they do so, they can forego the profit directly accruing from such capital. Thus it is, as I have already stated, that the question whether a port can be better administered by private individuals or by public authorities never arises.

In discussing the matter, however, from a general point of view, one can always suppose that the question does arise; and it may be asked if all ports cannot be joint-stock or private enterprises, or carried on under concessions which, though permanent, would give them the same character. Then, in comparing them, they would all be on equal footing, and no longer, as at present, on one about which no difference of opinion can exist. Would this be an advantage? That is the question.

We must first of all note that the government of nearly every country, and more particularly that of Belgium, enjoys a large credit. The rate of interest on public loans here is 3 per cent., and Belgium public funds are quoted above par. The city of Antwerp is able to borrow at 3.27 per cent., redemption in ninety years included. Now, in private industrial enterprises the capitalist is not content with

such a low rate of interest, demanding, in fact, the double of this return.

The capital engaged in the administration of a sea-port is necessarily very large. Speaking of Antwerp only, which has a tonnage, at entry, of 5,000,000, the cost is, in round numbers, 150,000,000 francs, or nearly 5,000,000 pounds sterling. This sum, calculated at 3 or 3½ per cent., necessitates a tax of only about 1 franc per ton on every vessel entering the port. But if the port were a speculative enterprise, then, for reasons before stated, this tax would not be lower than 1 franc 80 centimes per ton.

It is true that private capital would thus find an investment, which is now looked for elsewhere, either in State or municipal loans, and this, perhaps, would be an advantage for the capitalists. But with the present system the advantage is in favor of the consumer of the produce which passes through the port publicly administered.

It is also to be remarked that it is absolutely necessary that European ports should be able to cover the interest on the sums engaged in the construction of the works. But competition is causing the tariffs to be lowered everywhere below the rate which should be paid on capital, and this lowering of tariffs is causing trade to be diverted from one port to another.

By such means only the public administration, notably that of Antwerp, is able to attract and to maintain a fair share of business; and, if this system does not leave a fair margin of profit on the cost of construction, it has its compensation in the increased activity which the authorities are able to give to the working classes. If, therefore, a municipality make but a small profit, or even if it lose money, owing to the low rate of interest returned on the capital employed, it will find sufficient compensation in the increase of commercial activity of its population and of the ratable value of property. Antwerp just now gives constant employment to 30,000 workmen.

It must also be considered that no European port in these days, taken separately, could continue to exist under the system of private ownership; nay, many of them could not be opened at all, or at least would not be capable of further development.

To give one example: Antwerp, in 1830, owing to political circumstances, both of the past and of recent date, was almost lifeless, although she had been highly prosperous in the fifteenth century. From this epoch the successive development of her maritime installations had necessitated enormous pecuniary sacrifices, which have at

length borne fruit, but which would have discouraged, if not ruined, all private enterprises.

From the foregoing, then, we may deduce the following: —

1. The advantage of public ownership in docks, basins, wharves, etc., may be found (*a*) in the minimum rate of interest on the capital necessarily engaged; (*b*) in the possibility of diminishing the amount of direct receipts, with a view to struggle against competition, the compensation being found in the enhanced commercial prosperity thus created; (*c*) to the preference which a public administration can and should give, *cæteris peribus*, to a large traffic, whereas a private company, from its own particular point of view, would prefer, and with reason, a less traffic, but with more remunerative rates; and, (*d*) lastly, the impartiality and kindly protection which should inspire a properly organized public body.

2. Owners of private property, or persons to whom concessions have been made, have not been able, at least as far as I know, to defend any opposite theory.

3. An important element of prosperity is ever found in being able to reduce port charges, as this leads to more successful competition. Reductions, such as have already been made and such as will be made hereafter, would have been impossible with individuals or with companies, since not only is the rate of interest on loans very low, but there is no real necessity to cover it by the amount of actual receipts.

4. The development of the port of Antwerp is solely due to the intervention of the public authorities (the State and the town); and one may fairly assume that no private company could continue to exist under the severe competition actually existing, nor could it have rescued the port from the lifelessness into which in 1830 it had fallen. One may be permitted to think, however, that such a result would not have been wholly impossible if all other European ports, in competition with Antwerp, had also been administered by private enterprise.

I am afraid that these replies will not present to you that interest with which you regard the questions raised. As my knowledge of the subject does not go beyond the question of public ownership, from this point of view only have I been able to treat it.

G. Royers,
Chief Engineer of Public Works.

AUCKLAND (New Zealand).

[From the report of JOHN D. CONNOLLY, U. S. Consul.]

Answer to Question No. 1:

Auckland harbor, being remarkably easy of navigation, readily accessible at all times of tide and weather, having ample deep water at entrances and in harbor, has no rival port to enter into competition with, being practically the natural port for discharging and shipment of imports and exports for all the northern portion of New Zealand. It is, without exception (a fact which is admitted by all competent authorities), the best harbor in the colony, and has an anchorage area, with deep-water berthage, sufficient to accommodate all the fleets of the world at one time. It is completely land-locked and sheltered from all winds, and is the only port of call and departure in New Zealand for the San Francisco mail steamers, consequently it possesses mail advantages beyond those of all New Zealand ports. The port is connected by telegraph with the world's telegraphic system. A larger amount of tonnage enters and departs than in any other New Zealand harbor, and Auckland heads the list in customs returns for the past year (1894).

Having ample shed and wharfage accommodation, trans-shipments of cargo for coastal ports can be effected as cheaply as in any other port in New Zealand; and, owing to the geographical position of Auckland and its connection with the ports on the west coast of New Zealand by Manukau harbor, goods can readily be trans-shipped by either the east or west coasts of the island. By providing terminal facilities and graving dock accommodation for repairs to vessels of all sizes. The Auckland dock is 312 feet long, 65 feet wide and has 13½ feet of water on sill. The Calliope graving dock is 525 feet long, 100 feet wide and has 33 feet of water on sill. An ample, cheap and wholesome supply of fresh, pure water for shipping has been provided. There are 14,000 feet of berthage accommodation, with a depth up to 25 feet of water. The shed accommodation is very extensive, provision being made for over 20,000 tons of cargo. The harbor and approaches are amply provided with powerful lights, and all channels and shoals are clearly and adequately marked by buoys and beacons. The climate is mild and equable, and there is an absence of gales of wind or storms to cause damage to vessels or interfere with shipping work. The port has a large and cheap supply of kauri pine and other valuable timbers, for use and for export, and very large and increasing quantities of locally produced coal, of good quality and cheap, readily available for shipping or for manufactures.

Answer to Question No. 2:

Auckland harbor is an extensive land-locked estuary at the southern end of Hauraki Gulf; the inner harbor is fifteen miles long, with ample deep water. There is sufficiently deep water at entrance to allow vessels of any tonnage or draught to enter the port at all times of tide and weather, and the harbor is so sheltered throughout that vessels are not prevented from entering, berthing or leaving the port by gales of wind. The success of the harbor is increased by the contiguity of the Manukau harbor on the western side of the island, situated about seven miles distant, connected by rail, thereby readily allowing traffic to be diverted to either the east or west coasts, as may be found most convenient for trade. The natural advantages of the harbor and its entrances and surroundings foster and find employment for the largest fleet of small vessels belonging to any port in the Australian colonies. The harbor's success is still further increased owing to its being the nearest port to the Pacific Islands, hence the trade and advantages therefrom are enjoyed exclusively by this port. The harbor being about two days steaming nearer the American Continent than any other New Zealand port has no doubt much enhanced its prosperity.

Answer to Question No. 3:

By the management and control of the harbor, docks, wharves, piers, etc., being vested in a Board, — a local body, composed in a great measure of representatives elected by the citizens of Auckland and surrounding towns, — merchants, ship owners and those interested in shipping matters having also special representatives, thereby ensuring skilled, economical and efficient management.

Answer to Question No. 4:

That, as the management and control are vested (as per reply to Question 3) in a local body, the interests of the public are more readily protected, and any suggestion or alterations as to charges, management or of any other detail can be at once inquired into by the Board (or its committees), which meets each alternate Tuesday for the transaction of business.

Answer to Question No. 5:

The Board owns all the public wharves and graving docks in the harbor, and has the sole management and control of same. The

Board has very large endowments extending along the foreshore upon both sides of the harbor. In fact, all the harbor excepting the deep-water channel in the middle of same is the property of this Board, held direct from the Crown. All wharves, reclamations and structures of every description are therefore erected upon the property of, and are under the control of, the Board. All wharves, whether (as in the case of timber mills) erected for private enterprise upon reclamations, pay the same rates, and all dues and charges exigible upon public wharves are levied upon such wharves. There are no wharves in the harbor except those under the control of the Board, and, owing to extensive reclamations having been made by the Board upon the foreshore immediately in front of the city and leased in allotments, a very handsome rent roll has been created, which relieves shipping and merchants from extra rates being levied upon shipping or upon goods landed. The endowments belonging to the Board are very valuable, and must in the days to come be a very prominent factor in the success of the Board and consequent advantage to the interests of the port and the public. This Board has endowments far exceeding in value and extent those of any other local body in the Australian colonies.

Answer to Question No. 6:

The Auckland Harbor Board is constituted by an act of the New Zealand Parliament, entitled "The Auckland Harbor Board Act, 1885." Two members are appointed by the governor of the colony; four members elected by the borough council of the city of Auckland; one member elected by each of the borough councils of Parnell, Devonport and Birkenhead (adjacent towns); one member elected by the Auckland Chamber of Commerce; and three members elected by and out of persons who have paid to the Board the sum of three pounds during the year preceding election, and the persons whose names appear in the register book of shipping at the custom house at Auckland as owner or part owners of vessels upon date of election. Elections and appointments are biennial, each member holding office for two years, and being eligible for re-election or appointment.

Answer to Question No. 7:

There is no private ownership or control of docks, wharves and quays in this port; the Harbor Board owns and controls all wharves, docks, etc., as above mentioned, on behalf of the public. The value of the Board's properties is £663,228.

Answer to Question No. 8:

The Auckland Harbor Board has full and sole control over all cargo landed upon wharves, and power to levy charges upon same. It manages and controls all storage of goods in sheds, removes and despatches trans-shipment cargo, and manages all matters relating to docking of ships; and, as the Board is not a trading body, it manages all matters solely for the benefit of the public. The rates for goods and shipping are regulated in such a manner as not to bear too hard upon those interested, so long as the charges levied, together with the rents from reclamations, are sufficient to cover expenditure. The Board does not seek to make any profit, and all accumulations of money from every source are returned to those who paid it, in the shape of increased accommodation and appliances for the benefit of trade. The law does not allow any funds derived from levies upon shipping or goods in the harbor to be expended for any other than shipping purposes, charges being levied equally upon all classes of goods and equally upon all individuals affected thereby; any favoring of particular lines of trade is avoided, and anything approaching favoritism is effectually prevented; and, as the Board is at all times accessible for complaint or suggestion, the public good is carefully studied, and there cannot be any doubt but that the control of such important matters as harbor and dock dues and charges and shipping matters generally, being under the direction of a public body, is a great boon to the community.

Answer to Question No. 9:

Question practically answered in reply to No. 8.

Answer to Question No. 10:

The direct answer to this question is by taking the revenue of the Board for the past year and subdividing it under the several headings, showing the amounts of revenue derived from rents, from goods, from shipping charges, and for the use of appliances and miscellaneous matters, as follows: —

	£	*s.*	*d.*
Rents,	10,161	10	0
Goods, wharfage, import and export,	15,246	4	5
Shipping charges, wharfage licenses, port charges, harbor master's fees, dock dues, pilotage,	6,464	1	1
Use of appliances, etc., crane dues, weigh fees, use of sheds, vehicle and cab licenses, etc.,	1,673	11	3
Interest,	200	0	0
Total revenue,	33,745	10	9

All shipping charges are invariably paid by ships, and all other charges by consignees of goods and those using the appliances provided.

Answer to Question No. 11:

Yes. The railway wharf, owned by this Board, has rails laid upon it to ship's side, and ample shed accommodation is provided at rail. Frozen meat, timber, coal, etc., are shipped direct from rail.

Answer to Question No. 12:

No. All railways about Auckland are owned by the government of the colony, and the railway wharf is used by the government free of charge.

Answer to Question No. 13:

The railway brings a certain amount of coal, timber, wool, etc., from the interior for shipment, as stated in reply to Question 11. Auckland, however, is not dependent upon railway for landing or handling of cargo, as in some of our New Zealand ports; and, with the exception of large lines for manufacturing purposes, which are taken some distance out of town, all Auckland cargo, owing to the short distance from wharf to store, is dealt with by dray traffic. Trans-shipments to west coast are forwarded to port of trans-shipment by rail. East coast trans-shipments are dealt with on Queen Street wharf.

Answer to Question No. 14:

Owing to the depth of water at the main wharves, and ample berthage accommodation provided, vessels of every description frequenting the port are provided with accommodation alongside the wharves, and, excepting for the landing of gunpowder or explosives (vessels carrying which are not allowed to berth at any wharf until such explosives are landed), no lighters are used for shipping or discharging purposes in this port.

Answer to Question No. 15:

Auckland harbor is not a bar harbor; has ample depth of water in entrances to harbor and alongside wharves for all classes of vessels to enter and berth at any time of tide or in any weather, protection of vessels from damage by heavy weather, ample berthage and shed

accommodation for trans-shipment of cargo, all facilities for distributing cargo with despatch, economical and efficient appliances for discharging and handling cargo, and lower rates of charges than any other port in the colony. The aim of the Board has been to provide all requisites for shipping business at the minimum expense to the public.

Answer to Question No. 16:

Patent slip was provided in Wellington, and government has for many years had to guarantee and pay interest on cost of same. Slip not available for larger class of vessels. Napier: a large expenditure has been made for breakwater, but up to the present same is not available for shipping purposes for larger class of vessels. Lyttleton: breakwaters were constructed by provincial government, and handed over to Lyttleton Harbor Board as an endowment; but without these breakwaters Lyttleton harbor could not accommodate shipping as it does at present. Graving dock at Lyttleton has been constructed by Lyttleton Harbor Board, but does not directly pay interest upon expenditure. Timaru: large sums of money have been expended upon breakwater, and large steamers have been berthed within breakwater. Oamaru: large breakwaters have been constructed, but so far have proved unsuccessful, as the harbor revenue is now being dealt with by a receiver, for and on account of the bondholders.

In Otago harbor (Dunedin) enormous expenditure has been incurred in making a channel about seven miles long to Dunedin, and the Board has incurred a great amount of debt, which necessitates the levying of very heavy charges, to the detriment of the trade and commerce of the port. At New Plymouth a very large expense was incurred in constructing a breakwater which has proved a failure. The attempt to make artificial harbors in this colony, in contradistinction to the ports having natural advantages of shelter and deep water, has invariably proved to be beyond the means at the command of the projectors, and has, to say the least of it, not been successful in New Zealand ports. The Auckland Harbor Board built two graving docks at a cost of some £209,000, and directly these docks may be said not to pay; but when it is taken into consideration that a terminal port of any importance must of necessity provide dock accommodation, the direct revenue from the use of the docks is not the only item to be considered. If the providing of ample dock accommodation is the means whereby shipping traffic is directed to the harbor, — which is undoubtedly the case in this instance, — the indirect profit is in money actually earned for using the docks, more particularly when

(as in Auckland) the dock dues are designedly reduced to the lowest possible charge, in order to encourage use of same. It may be said that dock accommodation is as necessary to a harbor as streets to a city; and, although immense sums of money are spent in streets, directly the streets do not pay; so with graving docks, although dock dues do not pay interest of cost, yet indirectly the use of same causes a deal of revenue to be earned which would otherwise be lost, and no harbor can be ranked as a first-class harbor which lacks dock accommodation. In the case of this Board the charge for interest upon cost of construction of graving docks may be fairly said to be provided for by the rentals arising from reclamations, and such charge for interest, therefore, is met by revenue other than that produced by levies on goods and shipping, but is the proceeds arising from utilizing endowments.

Answer to Question No. 17:

Imports: general merchandise, salt, mining and agricultural machinery, etc.

Exports: principally timber, kauri gum, gold, silver, wool, hemp, skins, leather products, frozen meat, canned meat and fish, coals, ores, Island produce, shells, copra, etc.

U. S. CONSULATE, AUCKLAND, Oct. 30, 1895.

BELFAST (Ireland).

[From the report of JAMES B. TANEY, U. S. Consul.]

Replying to department despatch, dated July 12, 1895, containing instructions to furnish information upon the subject of docks and wharves of this port, I beg to report as follows: —

This prosperous city is located at the head of the Belfast Lough, and its harbor was originally at the mouth of an insignificant stream called the Lagan. As the city thrived and grew, the demands of commerce exacted larger and better shipping facilities than the natural and very restricted boundaries and conditions of the port afforded. The record has proved that the energy and commercial aptitude of the people were equal to the emergency.

Owing to the restrictions and annoyances arising from private ownership of docks, quays, etc., necessary enlargements and improvements of the port were difficult and slow. These serious drawbacks were finally overcome through imperial legislation, which was sought

and conferred upon the city. As far back as the end of the last century, power was given to place the management of the harbor under control of a public Board, to be known as the Belfast Harbor Commissioners, but not until the act of Parliament in 1847, giving this Board power to borrow money, condemn and acquire land, etc., did the development of the harbor keep pace with the growth and demands of commerce.

From a small port, with little depth and less accommodation for traffic, Belfast harbor has been improved and extended until it is among the finest in the kingdom. The largest ships and steamers which ply the Atlantic can sail up to the quays and docks without waiting for tide. From a registered tonnage of 31,475, in 1837, it has increased to 152,174; and from 288,143 tons cleared in 1837, it has increased to 2,085,953 tons in 1894. Its docks, quays and basin walls are constructed mostly of granite and upon the most improved plans; they represent a lineal quayage of 21,114 feet.

It is estimated that in round numbers $15,000,000 have been expended in improving and enlarging the harbor. All this sum has been borrowed at rates of interest ranging from 5 to 3½ per cent. In the beginning, when the work of the Harbor Commissioners was largely experimental and money scarcer than now, the rates of interest were highest. At present all the money needed can be borrowed at 3½ per cent. Harbor stock on that basis is at 11½ per cent. premium. The amount of outstanding indebtedness is about $5,800,000. The receipts from all sources for 1894 were $636,500 and the expenditures in round numbers were $523,000; of this sum, $125,000 were devoted to harbor improvements, about $228,000 were applied to interest on bonds, stocks and loans, and $25,000 to a sinking fund. After paying current expenses, an unexpended surplus of $113,000 was carried forward to the year 1895.

The members of this Board of Commissioners are selected from the best representative citizens of Belfast, generally manufacturers, merchants, ship owners and men who are deeply interested in the prosperity of the city, and who freely give much time and attention, without pay, to the important and responsible duties imposed upon them.

After a most careful inquiry, I have found no element of the community dissatisfied with the manner in which the trust is executed. Indeed, the ability and integrity of the Board and the scheme or plan under which it works and by which it is controlled are sources of pride, and are frequently and favorably commented upon, — the justice of which, I may say, is demonstrated by figures and facts.

To the qualifications in the act imposed upon electors is ascribed

one of the main causes of the success of the trust. It is claimed that these qualifications practically prohibit all illiterates from participating in the election of Harbor Commissioners. Both sexes are eligible to vote, providing they reside within twenty miles of the city and come within the scope of the subjoined schedule: —

SECTION XV. Owners of vessels or of shares in vessels shall be entitled to vote according to the scale following (that is to say): —

For a vessel or vessels, or a share or shares in a vessel or vessels, of fifty tons and less than one hundred tons, net register, 1 vote.

Of one hundred tons and less than two hundred tons, net register, 2 votes.

Of two hundred tons and less than four hundred tons, net register, 3 votes.

Of four hundred tons and less than seven hundred tons, net register, 4 votes.

Of seven hundred tons and less than one thousand tons, net register, 5 votes.

Of one thousand tons and upwards, net register, 6 votes.

SECTION XVI. Occupiers rated in respect of premises shall be entitled to vote according to the scale following (that is to say): —

Of premises of twenty pounds ($97.33) and less than fifty pounds ($243.32), net annual value, 1 vote.

Of premises of fifty pounds and less than one hundred pounds ($486.65), net annual value, 2 votes.

Of premises of one hundred pounds and less than one hundred and fifty pounds ($729.97), net annual value, 3 votes.

Of premises of one hundred and fifty pounds and less than two hundred pounds ($973.30), net annual value, 4 votes.

Of premises of two hundred pounds and less than two hundred and fifty pounds ($1,216.52), net annual value, 5 votes.

Of premises of two hundred and fifty pounds and upwards, net annual value, 6 votes.

Provided, that, where a person is rated in respect of premises occupied separately and also in respect of premises occupied jointly with another person or persons, the net annual value of the premises so separately and jointly occupied shall not be capable of being added together for the purposes of this section.

As R. Lloyd Patterson, Esq., president of the Chamber of Commerce, has requested that his answers to the questions be published verbatim, I have refrained as much as possible in the foregoing remarks from detailing what would be largely repetition of the aforesaid official statement. Both Mr. Patterson and Mr. James Musgrave, chairman of the Belfast Harbor Commissioners, whose answers to the questions also appear below, have been very considerate and courteous in rendering me aid; and, as these gentlemen

have thorough knowledge of the information wanted, their answers in their own words will be appreciated. While the answers of both are frequently the same, there is sufficient divergence to justify the submission of each.

ANSWERS BY R. LLOYD PATTERSON, ESQ.

Answer to Question No. 1:

Largely to its geographical position.

(*a*) Rendering it the natural outlet for the produce of the neighboring counties.

(*b*) Its proximity to the coal districts of Ayrshire, Cumberland and Lancashire.

(*c*) Its great convenience for passengers between this country and the north-west of England and south-west of Scotland.

(*d*) Its proximity to the great manufacturing towns and districts of Lancashire and Yorkshire.

Answer to Question No. 2:

To a comparatively small extent.

Answer to Question No. 3:

To a very important extent.

Answer to Question No. 4:

Same.

Answer to Questions Nos. 5 and 6:

Entirely public; it is a public trust, managed by an unpaid Board of twenty-one elected members (and one or two *ex officio*), called the Belfast Harbor Commissioners. One-third of the Board retires each year, so there is an annual election by the rate payers and ship owners of seven members. Casual vacancies are filled by co-option.

Answer to Question No. 7:

At one time there was private ownership, but forty-eight years ago, in 1847, this began to be extinguished. An Act of Parliament was then passed, creating the trust, and giving the Board borrowing powers and power to acquire such private docks, etc., as then existed. Prior to that a so-called "Ballast Board" existed, which managed the river, channels and approaches; but the newly created Board absorbed it and took over its debt, then about $973,000. The result has been undoubtedly beneficial. The first rate of interest paid was 5 per cent., then reduced to 4½ per cent., then 4 per cent. and now 3½ per cent. These 3½ per cent. bonds are selling

to-day at 11½ per cent. premium. There are two causes operating to make the bonds so desirable, viz.: the plethora of money and the difficulty of satisfactorily investing it; and, secondly, the improved condition of the credit of the Belfast Harbor Board, based no doubt upon the rapid growth and prosperity of the city, and consequently a corresponding growth of her commerce and shipping business.

Answer to Question No. 8:

Worked in the public interest, no private individuals come in to make profit out of the undertaking; so, considering the facilities offered, the dues are moderate.

Answer to Question No. 9:

I am now unable, without inquiry, to state the terms; but conditions have so changed that the information would be of no practical value.

Answer to Question No. 10:

From both; the amounts from each and the other sources of revenue are shown in the last annual report. Cargoes generally pay the landing charges.

Answer to Question No. 11:

Yes; but only recently, and as yet to but a moderate extent. This has been found so advantageous that the system is likely to be gradually extended and improved.

Answer to Question No. 12:

The three local railways connect, more or less, with certain quays, the rails on the latter being the property and under the control of the Harbof Board.

Answer to Question No. 13:

The prosperity of the port commenced before the railway connections therewith were formed, but those have undoubtedly contributed to its continued development.

Answer to Question No. 14:

No. (Note: A not very extended system of inland navigation by lighters on a canal exists from this port)

Answer to Question No. 15:

Nothing special, beyond the railway connections already mentioned and a number of steam cranes for discharging coal, sometimes direct from the ships into railway wagons.

Answer to Question No. 16:

Public funds (government moneys) have been expended at Kingston, Holyhead and other places, which are still used, and again at others, such as Donahadee and Fortpatrick, which are not now used. In the former case the expenditure has been fully justified, in the latter it has not. Of moneys spent by boards and trusts, as here or at Liverpool, Hull, Glasgow, etc., I only know of one case not justified by results.

Answer to Question No. 17:

Imports: barley, lumber, grain, cement, coal, iron.
Exports: cattle, coal, iron, linen, potatoes.

Answer to Question No. 18:

The success of this port generally is the result of the foregoing, coupled with foresight, energy, enterprise, ability and purity in its inception, construction, maintenance and administration.

ANSWERS BY JAMES MUSGRAVE, ESQ.

Answer to Question No. 1:

Natural advantages of harbor and commercial aptitude of the people

Answer to Question No. 2:

Spacious estuary, safe anchorage, small rise and fall of tide (which only averages about nine to ten feet), give great facilities for trade.

Answer to Question No. 3:

I cannot say, but Belfast harbor being vested in a public corporation who are elected from a class of merchants whose interests are identical with the cheap and efficient management of the harbor estate, it is reasonable to suppose that the great success of the harbor has arisen to a large extent from its system of management.

Answer to Question No. 4:

Belfast harbor being a public trust, I cannot say what it would have been under private ownership.

Answer to Question No. 5:

Entirely public; previous to 1847 much of it belonged to private owners, but public opinion required the Harbor Commissioners to obtain parliamentary power to purchase all private rights, which was done in that year.

Answer to Question No. 6:

The harbor is managed by a corporation of twenty-one Harbor Commissioners, the lord mayor being *ex officio*. Each commissioner holds office after election for three years. Seven retire each year, who are eligible for re-election by a constituency comprising every citizen whose property is valued at one hundred dollars per year, the votes increasing up to six, according to increasing value, and by ship owners in certain proportion according to tonnage.

Answer to Question No. 7:

Yes, as already explained. By an act of Parliament. The result has been beneficial.

Answer to Question No. 8:

Under public ownership moderate dues are imposed and facilities provided, with a view to the development of trade. Private ownership looks for the greatest return it can get.

Answer to Question No. 9:

Do not exist.

Answer to Question No. 10:

About one-half of the revenue from rates is derived from a tonnage rate on ships, the other half from a rate on goods landed on the quays for export or import. The merchant pays the landing charges; sometimes the goods are landed on the quay by ship.

Answer to Question No. 11:

Yes. The three trunk railways which communicate with the interior of Ireland come to the limit of the harbor estate, and from thence the commissioners have laid down rails that bring the railway wagons alongside the ships, the haulage being done by the railway companies.

Answer to Question No. 12:

Answered by reply to Question No. 11.

The Harbor Commissioners charge two cents per ton on goods carried for the use of the harbor tramways, which repays them about one-half of the maintenance of the tramways and the interest on the cost of same.

Answer to Question No. 13:

Impossible to say. The railways of course greatly benefit the trade of the town, but the tramways to the ship's side have not done much to extend

trade, as the railway companies charge a substantial sum for carrying goods to or from the ship's side, — almost as much, in fact, as the old charge for carting from ship to railway.

Answer to Question No. 14:

Yes. The Lagan Navigation Company, which extends into the Ulster Canal Company. These lighters do a large amount of inland trade, but they confer a vast benefit on trade by keeping down the railway charges for carrying goods.

Answer to Question No. 15:

The Harbor Commissioners provide a very large extent of shedding along the quays for the protection of the goods in transit, and a large number of steam cranes is provided for the use of such merchants as require them, but I think most other ports of similar size provide similar facilities.

Answer to Question No. 16:

Yes; Liverpool, Glasgow, and all other ports where the local authority has been incorporated by Parliament.

Belfast harbor and docks and quays are all developed out of money borrowed, first on bonds bearing interest at 5 per cent., subsequently reduced to 4 per cent. and now in process of being converted into $3\frac{1}{2}$ per cent. consolidated stock which commands a premium of 10 per cent. in the market.

Answer to Question No. 17:

Large quantities of bread stuffs and timber and other building materials are carried over our quays Of the staple trade carried on in the locality, the most important is lime; but, like Glasgow, Belfast has a great variety of industries of less importance but yet of great value, — ship building, iron founding and engineering, cotton, muslin, hemstitching and embroidery, pork curing, biscuit making, aerated waters, etc.

Answer to Question No. 18:

The information given exhausts everything I can say.

U. S. Consulate, Belfast, Aug. 23, 1895.

BOMBAY (British India).

[From the report of S. Comfort, U. S. Vice-Consul.]

The great importance of Bombay is due to the fact that it possesses the finest harbor on the coast of Hindustan, and is most conveniently located for accommodation of the immense freight and passenger traffic between India and Europe.

As an *entrepot* for European trade with India it has no rival on the western coast. The harbor is very extensive, and capable of affording safe anchorage for a very large fleet of vessels of the heaviest class.

The entire water front of Bombay harbor available for shipping purposes is owned by a public trust controlled by the government, called the Bombay Port Trust. This trust has done much to increase the facilities for handling the extensive business of the port. It has constructed two commodious wet docks, with a combined area of 55 acres, and 2½ miles of quayage and a dry dock, besides making other very extensive improvements.

From the organization of the Bombay Port Trust in the year 1873 to March 31, 1895, the total expenditures on capital account have amounted to 54,330,982 rupees. The capital debt of the trust on the latter date was 50,755,900 rupees, of which 30,132,224 rupees was due to the government, 13,080,876 rupees was in debentures, and the balance, 7,542,800 rupees, in port trust foreshore securities, issued in payment for property purchased. Of this indebtedness, 373,760 rupees, due to the government, was non-interest bearing, 337,835 rupees was at 3½ per cent., 26,376,902 rupees at 4 per cent., 20,334,403 rupees at 4½ per cent., and the balance, 3,333,000 rupees, at 5 per cent. per annum.

The earliest shipping returns available for comparison are for the year 1871–72. They compare with 1894–95 as follows:—

	1871-72.		1894-95.		Increase.		Decrease.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Steamers.								
Foreign trade, .	227	252,915	664	1,301,304	437	1,048,389	-	-
Coasting trade, .	208	74,279	1,279	766,874	1,071	692,595	-	-
Sailing Vessels.								
All kinds, . .	893	372,524	499	45,322	-	-	394	327,202
Country craft, .	32,429	708,912	43,405	691,688	10,976	-	-	17,224

This shows a remarkable change in the character of the tonnage in a period of twenty-three years. The greatest increase is in steamers in foreign trade, and the decrease in square-rigged vessels is equally remarkable. But these changes are undoubtedly due more to the opening of steamer traffic through the Suez Canal than to any other cause. Nor can the great increase in steam tonnage in the coasting trade and comparatively small decrease in tonnage of country craft be attributed to any great extent to the improvements in the port of Bombay, but rather to the general development of the business of the country.

The value of the total foreign trade of Bombay in merchandise only (exclusive of treasure) in 1894–95 was 680,000,000 rupees. The value of the total coasting trade in merchandise only in 1894–95, similarly, was 210,000,000 rupees.

The Bombay Port Trust is governed by a Board of thirteen members, called the "Trustees of the Port of Bombay," consisting of twelve trustees and a chairman; five of the trustees are elected by the members, for the time being, of the Bombay Chamber of Commerce, and seven trustees and the chairman are nominated and appointed by government, by notification in the "Bombay Government Gazette." The term of office of trustees, both nominee and elective, is two years. The chairman holds office during the pleasure of government, provided that he does not, in the mean time, cease, through disqualification, to be a trustee.

In consequence of the varying tides at different seasons and the shallow water with rocky bottom near the shore, it is impracticable to provide wharves alongside of which large vessels can lie in safety. It was, therefore, found necessary to construct wet docks, into which vessels are admitted at high water, after which the gates are closed until the tide is again at its flood. This, in connection with the immense warehouses and other improvements necessary for the accommodation of business, involved a very large expenditure, which was much more easily provided for by the use of government and public credits than it could have been in any other way.

All such vessels as do not enter the docks are anchored in the harbor opposite the city, some a mile or more from shore. Petroleum, coal and some other kinds of cargo are landed on the bunders by lighters at moderate cost. These lighters are owned by individuals and kept for hire. A class of contractors called muccadums take cargo from alongside vessels and land it on the bunders or place it in the go-downs of consignees. These muccadums employ the necessary lighters, coolies and carts, and do the work at rates fixed by special agreement. The cost of handling cargo by this means is in many

cases less than it would be by using the wet docks, which, however, is not always possible. Kerosene oil is not allowed to be loaded or unloaded in the docks, on account of its supposed dangerous nature.

The total revenue proper of the port trust for the year 1894–95 was 4,725,874 rupees; the expenditures under revenue during the same period were 4,717,941 rupees. The revenue is derived chiefly from wharfage fees that are charged on all kinds of goods and products landed on shore, whether at the docks or on the bunders, as well as on all articles exported from shore. The rates of charges on these are special, and are by weight, measurement or package, according to the nature of the goods. A large income is also realized from ground rents and rent of warehouses owned by the port trust. The consignees of the goods pay the landing charges.

There are two great systems of railways connecting Bombay with the interior of India, which have developed the country and the business of the port trust of Bombay to a very great extent. Both of these are connected by switches with the wet docks and some of the bunders. A local railway connecting with all docks and bunders is projected by the port trust, and will probably be completed in the near future.

U. S. CONSULATE, BOMBAY, Dec. 3, 1895.

BORDEAUX (France).

[The report of JOHN M. WILBY, U. S. Consul.]

Answer to Question No. 1:

The port of Bordeaux can scarcely be regarded as being in competition with other French ports. There are three important ports in France: the first is Havre, which is the port of Paris and a greater part of north-western France; the port of Bordeaux, which receives and ships merchandise from the south-western part of France; and the port of Marseilles, which serves a like purpose for southern France. Of course there are many other ports, like Dunkirk, Boulogne, St. Malo, Brest, La Rochelle, Rochefort and Bayonne, but their trade in no way interferes with that of the largest sea-coast cities.

Answer to Question No. 2:

The physical features of the harbor of Bordeaux enter, and have for centuries entered, in a great measure into its success. It is situated on the Garonne River, about sixty miles from its mouth. This stream is navigable up to Bordeaux by the largest ocean steamers, and is in some places five miles in width. Bordeaux and the southwestern portion of France, being one of the greatest wine-growing districts of the world, and importing at the same time immense quantities of merchandise from other countries, naturally was forced to have a port, which has served commerce ever since shipping and ships existed.

Answer to Question No. 3:

The management and control of the docks and quays of Bordeaux effect in a great measure, though not entirely, its success. There are, strictly speaking, no wharves; that is to say, the entire river front, about three miles in length, is arranged in such a manner that vessels can load or discharge their cargoes at its very edge. The quays of this and of other French cities are under the control and supervision of the government. The rules and regulations are, of a natural consequence, identical in all cities.

Answer to Question No. 4:

It may be said that the State's control of the docks and quays in France materially affects their success. They are kept in a perfect condition by government engineers and workmen, and are in every respect admirable in appearance and management.

Answer to Question No. 5:

The answer to this question is embraced in that given above.

Answer to Question No. 6:

The docks and quays of French sea-ports are controlled by what is called the Administration des Ponts et des Chaussees; that is to say, the Board of Bridges, Docks and Roads. Like all other government administrations, entrance to it can only be had by passing an examination. Promotions follow, and the directors are those who have been longest in the service.

Answer to Question No. 7:

The answer to this question is embraced in those given above.

Answer to Question No. 8:

To this question the answer is embraced in those given above.

Answer to Question No. 9:

The docks and quays of French sea-ports have for a great number of years been under the control of the government. Those who owned land bordering on the river front were naturally compensated for the taking of this land by the State; but this is now so far back that it would be almost impossible to tell what were the sums paid. Of course the amounts varied according to the situations and commercial importance of each town.

Answer to Question No. 10:

The principal source of revenue of the docks and quays comes from charges on vessels.

Answer to Question No. 11:

A railway runs along the entire river front of Bordeaux, parallel with the quay. It communicates on either extremity of the city with all the important lines which enter and leave Bordeaux. In this way merchandise may be sent to any part of the country or received from it.

Answer to Question No. 12:

The railroad connecting the main lines with the docks is owned by the State, but three separate lines are, for a certain consideration, given the privilege to use it, as each of these lines has separate rates of freights. Charges of course vary.

Answer to Question No. 13:

A great degree of success, though not all, may be attributed to Bordeaux through its railway connections. I repeat, however, what has been stated before, — that this city has been since the time of the Roman invasion of the Gauls an important commercial centre, and was so before railways existed.

Answer to Question No. 14:

Numerous lighters and sailing boats ply between Bordeaux and the various cities situated on the Garonne River; they carry wine, food stuffs, etc. Bordeaux is also connected by a canal with many important cities of southern France. The canal and lighter charges are in all cases moderate.

Answer to Question No. 15:

Bordeaux possesses terminal and distributing facilities superior to those of other parts in this region.

Answer to Question No. 16:

I know of no French sea-ports where the docks have not been built by, and are not under the direct control of, the government, and La Rochelle is the only one where receipts do not warrant expenditures.

Answer to Question No. 17:

Fruit, glycerine, gum, macaroni, mineral waters, nuts, olive oil, paper, prunes, rags, sardines, skins, tartar, truffles, vanilla, vegetables, wine and wool.

U. S. CONSULATE, BORDEAUX, FRANCE.

BRISTOL (England).

[From the report of F. B. GIRDLESTONE, Secretary and General Manager Bristol Docks Committee.]

BRISTOL DOCKS OFFICE, QUEEN SQUARE,
BRISTOL, July 4, 1895.

Answer to Question No. 1:

The port of Bristol is essentially an import port, the greater portion of the vessels which frequent it resorting, after discharge of their cargoes at Bristol, Avonmouth or Portishead docks (all of which are within the port of Bristol and belong to the corporation of Bristol), to Cardiff, Newport, Barry or one of the other coal ports in South Wales for their export cargoes.

The only port which can be said to be in close competition with Bristol is Sharpness, twenty miles further up the Severn than Avon-

mouth, between which and Gloucester there is a canal capable of accommodating vessels drawing about eighteen feet.

The port of Bristol enjoys considerable advantages over Sharpness, inasmuch as there is deep water close to the mouth of the Avon and a straight lead thereto from the ocean. Vessels bound to Sharpness often have to wait some days for adequate water. Under these circumstances vessels prefer to discharge at the port of Bristol rather than at Sharpness.

Vessels of large size can enter the Avonmouth or Portishead docks on nearly every tide of the year towards time of high water; and, as regards the city docks (which are six miles up the river Avon), there are but few tides on which a vessel drawing say sixteen feet cannot proceed direct from sea thereto. Vessels of deep draught have occasionally to wait two or three days in Kingroad at the mouth of the river for tide.

Another great advantage enjoyed by the port of Bristol is the fact of its very central position and consequent convenient facilities for distribution of cargo to inland towns, as far as Birmingham on the north, Reading on the east, Exeter on the south-west and by water to all the ports within and around the Bristol channel.

Another advantage which the port enjoys over its competitors is the low tariff of its dues and laborage charges, and the fact that for very many years it had been considered as practically the metropolis of and chief distribution depot for South Wales, and a great importing centre for all American, Canadian and West Indian produce. The importing merchants reside chiefly in Bristol, and not at Cardiff, Newport, Barry and other South Wales ports. Bristol markets have always had a great renown, and the city has made great strides of late years in industrial enterprise, population and wealth.

Answer to Question No. 2:

The great range of tide, viz., forty-two feet at springs and twenty-five feet at neaps at the city and outer docks respectively, the easy and deep-water channel leading thereto and the sheltered and inland position of the docks certainly contribute much to the success of the port.

Answer to Question No. 3:

The very efficient staff of officials, foremen and laborers kept up by the corporation (who are the owners of the docks, and practically do the whole of the work both for the ship and merchant at Avonmouth and Portishead, and also to a large extent at Bristol), the efficient and rapid way in which all laborage operations are conducted,

the low tariff of charges, and a system of giving corporation warrants for goods stored, undoubtedly contribute greatly to the success of the port, and to the favorable view which ship owners and merchants take of it as a convenient and economical centre for importation and distribution of foreign produce. There is no dock, it is believed, in Great Britain where better facilities to traders are provided, or where the work is done with greater despatch or so nearly at cost price as by the corporation at this port.

Answer to Question No. 4:

The fact of the corporation being the owners of the docks enables capital required for dock purposes to be raised on very easy terms. The capital so raised to date amounts to £2,100,000. Money can now be borrowed for dock purposes by issue of debenture stock at about $2\frac{7}{8}$ per cent., the lenders having, in addition to all the works and dock revenue as security, a lien on the borough rate. The dock $3\frac{1}{2}$ per cent. debenture stock (which is practically irredeemable) is to-day quoted at the price of $123\frac{3}{4}$ per cent. Parliament, however, compels all capital so raised to be liquidated by means of a sinking fund within fifty years from the time each sum is borrowed. This sinking fund entails now a charge on the dock revenue of about £9,000 per annum.

Answer to Question No. 5:

As above set forth, the ownership and control of all the docks within the port of Bristol vests in the mayor, aldermen and burgesses of the city of Bristol.

The principle of working aimed at is not so much to make a profit as to increase the volume of traffic by keeping the tariff of charges low, and providing from time to time (largely out of revenue) such further sheds, cranes, quays, railways, telephones, etc., and other facilities as the ever-changing type of traffic, and vessel in which it is conducted, seem to call for.

If, however, the docks estate in any year yields a profit, that should strictly be paid into the borough fund to the relief of the general city rates. As a fact, up till recently the docks estate, owing chiefly to large sums expended out of its ordinary revenue on new works, has been more or less a burden on the citizens; but this year (1895) it has, exclusive of sinking fund and notwithstanding an expenditure of nearly £14,000 on extraordinary works, arrived at a state of equilibrium; *i. e.*, all dock and harbor expenditure has been met out of the dock and harbor resources, without any recourse to a "rate in aid" from the citizens, as has been the case heretofore.

But, as referred to, there has been included in the dock accounts for many years past large sums on account of extraordinary new works, and, in addition, a sinking fund amounting now to about £100,000 has been built up. By means of this fund the citizens about fifty years hence will possess a splendidly equipped dock estate, practically free of debt.

Answer to Question No. 6:

The docks committee consists of nineteen members of the town council, who are appointed annually by the town council to manage the affairs of the dock estate and report thereon from time to time to the town council. That committee has under it a general manager and secretary, engineer and two assistants, collectors of dues, a chief clerk, a legal officer, six dock masters, three traffic managers, and other officials and a large staff of clerks. The working of the dock estate is regulated by by-laws and regulations, by minutes passed by the council and committee and by orders passed in urgent cases solely on responsibility of the general manager.

Answer to Question No. 7:

The Avonmouth and Portishead docks, which are at the mouth of the river Avon, were constructed by private companies and taken over by the corporation under parliamentary powers in 1884, the object aimed at being the stoppage of the insane competition between the three different dock concerns, and the saving of ruinous loss which thereby was caused to the citizens from the working of their city docks. The results aimed at have been attained, inasmuch as that competition has ceased, and it has been found possible to so readjust all the dues and charges as to secure a very considerably greater revenue from the working of the united concerns than could ever have been obtained from the three under separate ownership. Again, those vessels which can physically come up to Bristol, and which before the amalgamation were being diverted to Avonmouth and Portishead, have since the amalgamation come up to Bristol, thereby largely adding to the indirect advantage of the citizens. Only the very large vessels and those required to be discharged with despatch are now being taken into the outside docks.

Answer to Question No. 8:

The commercial advantages given by public ownership over private ownership of docks, wharves and quays consist, in my opinion,

of the rates being fixed alike to all customers under similar circumstances, of there being no discounts or rebates allowed; *i. e.*, of all dues and charges being levied impartially and maintained at the published tariff without fear or hindrance, and the absolute refusal to give any rebates, drawbacks or other reduction from this published tariff. Again, a public authority, being able to raise its money on lower terms than private owners, and having no dividend to pay, has more interest in keeping the docks in an efficient condition and furnishing them with the additional appliances and accommodation required from time to time by the ever-changing type of vessels and conditions of working traffic. Private owners, seeking only to work the docks for dividends, naturally maintain a high scale of charges, which is against the trader's interest. They also hesitate to expend further capital until they are actually forced to do so either by a threatened loss of traffic or an inability to accommodate the ordinary vessels plying at the time in the different trades.

Answer to Question No. 9:

The terms arranged for the purchase of the Avonmouth and Portishead docks were based on the net revenue which the corporation thought they could, without detriment to the volume of traffic, derive from those concerns when worked as a part of a united dock undertaking, together with a small sum for good-will.

Avonmouth dock was purchased for about two-thirds and Portishead dock for about four-fifths of what they had cost their former proprietors. The funds for purchasing those docks were raised by the issue of corporation debenture stock on the security of the dock estate and borough fund, which includes the dock dues, etc., under the powers given by Parliament in the purchase act of 1884.

Answer to Question No. 10:

The principal revenue of the docks and quays comes from dues on vessels and their cargoes, dues on animals from foreign and coastwise, transit shed rates, license fees on barges and boats, dues on vessels lying up, rates for use of dock canal, rates for use of gridiron and pontoon dock, rent of properties and ferries, transfer fees, sale of old materials, hire of dredging gear and dues for use of patent slip. Revenue is also derived in the traffic department from the working of the foreign animals wharves, from laborage performed for ship owners and merchant, for use of sacks and sundries, for shunting and for use of plant, and in the warehouse and granaries and quays from rents on goods stored therein or stacked on.

At the port of Bristol the custom is for the ship owner to raise the cargo to the ship's rail, the merchants taking it from the ship's rail and landing it onto quay or into truck, barge, cart or shed. In the case of bulk grain the merchant has to do a certain amount of work in the hold.

Answer to Question No. 11:

At the Avonmouth and Portishead docks the Great Western and Midland Railroad companies' trucks have direct access to the dock quays and vessels lying thereat.

At the city docks only the Great Western system of railway is directly connected with a certain portion of the deep-water berths. The Midland and London and South-western companies collect goods by barge, and cart free of cost to the trader. At all three docks vessels can discharge and receive freight direct from railway trucks, and this is a convenience which, coupled with ample sheds and cranes, any dock seeking to be a first-class dock and competing with other docks must of course have, in order to conduct grain and general traffic.

Answer to Question No. 12:

The lines within the dock premises both at Avonmouth and Portishead belong to the corporation, and similarly on certain portions of the deep-water quays at Bristol. At present no tolls are taken from either the owner of the goods conveyed in the trucks or from the railway companies whose trucks are conveyed by the corporation engines over these lines; but the corporation is now at law with the railway companies for the recovery of the cost of such shunting, or making it compulsory on the companies to supply the locomotive power themselves. The shunting costs about six pence a ton, including interest on the first cost of lines and plant.

Answer to Question No. 13:

Undoubtedly the trade at this port, which is largely in grain and provisions and timber, could not be worked at all, or at any rate profitably, without the deep-berth quays being connected with the railway systems of the country; but the port of Bristol has this great advantage, viz., that, in addition to having railway connection with three of the great systems with its deep-water quays and warehouses, it has a vast fleet of coastwise vessels plying daily from the port in all directions, near and far, along the shores of the Bristol channel

and to Ireland, as well as to all the principal ports in England and Scotland. It has also a first-rate system of inland communication by means of canals, the Severn Canal running northwards to Birmingham and the Kennett and Avon, and Berks and Wilts canals eastwards as far as London, which enables heavy goods to be distributed very economically and tolerably rapidly to the leading towns in Great Britain.

The railway companies might, however, do far more for the port than they do, especially in the matter of assisting to provide proper accommodation for the largest type of ocean mail and passenger traffic, for which this port, from its great range of tide and nearness to London and direct and easy channel navigation, offers peculiar facilities.

Answer to Question No. 14:

The corporation owns several big lighters and hulks, and uses them chiefly for the purpose of giving despatch to the liners discharging at Avonmouth dock. There is no public system of lighterage. The lighters and barges are owned by private firms, and are obtainable at very moderate rates. There is great competition within the port for all classes of lighterage work. Its cost varies, according to distance and bulk, from six pence to one shilling per ton.

Answer to Question No. 15:

The superior advantages of the port of Bristol over other practically similar ports in regard to terminal facilities consist of a complete set of transit sheds round the quays alongside the deep-water berths. For its size there is probably not a better equipped dock in this respect than Avonmouth, or what is called the harbor railway wharf at Bristol.

As regards the distributing facilities, these have already been referred to in answer to Question No. 13.

Answer to Question No. 16:

Up till quite lately Bristol was the only port in the United Kingdom owned by a municipality. The municipal bodies have, however, lately been authorized to build docks and provide other terminal facilities at the port of Manchester, Boston (in Lincolnshire) and Preston. There are many other ports, such as all the Scotch and Irish ports, also Liverpool, Swansea and other places, where the control is in the hands of the public trusts, who raise their money on the security of the harbor dues only.

As regards the expenditure on docks by municipal bodies, it is notorious that both at Preston and Manchester the results so far in regard to revenue have not come up to those predicted, and that the citizens of those places will for many years to come be mulcted very heavily in rates, in order to provide funds for meeting the interest for which they have made themselves responsible in respect of the money invested in those undertakings. At Preston the rate borne by the citizens already amounts to one-eighth in the pound, and little or no foreign traffic has been attracted. At Manchester the citizens are responsible for interest on £5,000,000 invested in the ship canal undertaking. Bristol is one of the few, if not the only port in England, where the municipal funds invested therein have resulted most advantageously to the citizens; and this can be easily proved by the increased value of the ratable property, increased population and industries started in and around the city, and the great indirect profits reaped by the citizens from the large trade done in the heart of the city.

Answer to Question No. 17:

The chief staple traffics at the port of Bristol are grain, timber, refined sugar, petroleum, provisions, seeds, oil-cake, ores, fruit and foreign cattle.

In addition, I would state that the city docks at Bristol were made by damming up a certain portion of the old tidal river Avon, under an act of Parliament obtained in 1803, a new cut being made for the upland waters to pass down to the Severn. This was a great work at the time, and cost the best part of £750,000. The work was undertaken by a joint stock company, in which the corporation of Bristol and the Merchant Venturers' Guild held shares. The company was, however, always in financial difficulties, and charged very high rates, which the act of Parliament permitted. This policy proved so detrimental to the trade of the port that at length in 1848 the corporation determined to take over the dock estate for the benefit of the city.

The act under which they obtained this power compelled them at the same time to lower the dues to the extent of quite two-thirds, both on vessels and goods, any deficiency in revenue caused thereby being made good by the power to charge a rate in aid on the citizens to the extent of four pence in the pound.

Generally speaking, it may be said that the trade of the port has since then continually increased. Docks at Avonmouth (seven miles below the city) and at Portishead (two miles below the river mouth)

were opened by private companies in 1877 and 1881 respectively for the purpose of accommodating only the bigger class of vessels which could not physically get up to Bristol. Those docks, however, failed to get any very large ocean liners, and at once commenced a severe competition with the corporation docks. This competition became so ruinous that in 1884 the corporation, in self-defence, had to buy both docks, giving therefor very considerably less than the docks had cost their original owners. The three sets of docks are now worked as one concern by a committee consisting of nineteen members of the town council, appointed annually by that body.

The total capital of the dock estate is about £2,100,000. In addition to the revenue from the dock estate, the city from time immemorial has the right to charge certain city dues on vessels and goods resorting to the old city docks; and out of these dues considerable sums have during the last fifty years been expended in improving the quays, erecting sheds and cranes and providing other trading facilities.

Taking the whole revenue, dock estate and city dues, together, the net revenue has sufficed to pay 3.59 per cent. on the outstanding capital of the whole concern.

The policy of taking over the whole of the docks by the citizens has proved an exceedingly wise one, the foreign trade, population and wealth of the city having enormously increased, and the works having been maintained in a high state of efficiency, generally out of surplus revenue earned by the docks.

Taking the amount of rate in aid paid by the citizens of the docks estate since the transfer to the old docks from the private company in 1848, and the amount of city dues paid in by the docks and harbor estate to the borough fund during that time, you will see that the two pretty well balance each other. Enormous sums, however, have been expended out of the united revenue not only in improving the river (which is now navigable by steamers of 1,200 tons register and sailing vessels of 1,800 tons register on all ordinary tides), but more than £250,000 on other works found requisite according as the trade has increased and type of vessel changed.

The great advantage of a public authority owning the docks estate as compared with a private company is that it can raise its money far cheaper. We, for instance, raise ours at 2.16 per cent., the works are kept in a more efficient state, the dues and charges are also lower, and invariably maintained at the published scale.

A great many docks and harbor concerns in this country are worked by harbor trusts, and raise their money on the security of the docks or harbor revenue only. This port up till quite lately was unique as

regards ownership by a municipality. Manchester and Preston have now adopted the same course; but I fear that, in view of the enormous expenditure to which they have committed the citizens, it will be many years before their capital becomes remunerative.

My opinion is strongly in favor of public ownership of docks and harbors.

BRISTOL DOCKS COMMITTEE, July 4, 1895.

CAIRO (Egypt).

In compliance with circular instruction of July 12, 1895, based upon the request of the Massachusetts State Board on Docks and Terminal Facilities, I have the honor to transmit reports upon the docks and wharves of Alexandria and Port Said, prepared by the consular agents at those ports.

FREDERIC C. PENFIELD,
Consul-General.

U. S. CONSULATE, CAIRO, Nov. 16, 1895.

Alexandria.

Answer to Question No. 1:

If our port is a success, it is because it is a government monopoly, and really has no rival, unless Port Said can be called one.

Answer to Question No. 2:

To the fact of there being a large artificial breakwater (made of stone and hydraulic lime blocks, weighing fifteen tons each), and to the fact of there being quays and sheds, alongside of which most steamers lie, and down which cargo-laden trains run alongside the steamers.

Answer to Question No. 3:

The management and control of the wharves and quays are in the hands of government officials, and leave a good deal to be desired; under better management, the success will be greater.

Answer to Question No. 4:

See answer to No. 1.

Answer to Question No. 5:

Wholly Egyptian government.

Answer to Question No. 6:

The use of wharves (there are no docks, except a floating dry dock in bad order, good enough only for a steamer of say 1,500 tons net register; this, too, is government property, but managed by another department than the post-office) is controlled by chief officers, nominated by the British government.

Answer to Question No. 7:

See answers to Nos. 1 and 3.

Answer to Question No. 8:

Private ownership does not exist and never has existed.

Answer to Question No. 9:

See No. 8.

Answer to Question No. 10:

Both vessels and cargoes are charged for use of the quays; the former by an annual payment, the latter by so much per package, which goes to the customs department. Agents of vessels charge 80 cents per ton for landing measurement goods and 50 cents for landing charges (called here quay dues). For other goods, by weight.

Answer to Question No. 11:

Yes; see No. 2.

Answer to Question No. 12:

The railway system in Egypt, like the port here, is out-and-out government, controlled by what is locally known as the Board of Administration (this, too, has supreme control over the port of

Alexandria), composed of three members, one British (president), one French and one native.

Answer to Question No. 13:

A great deal.

Answer to Question No. 14:

Yes; lighters are used by steamers with general and coal cargoes, but this system is only adopted when quay space cannot be had. A lighter (average size) contains 30 tons of dead weight, and may be hired for $1 per day.

Answer to Question No. 15:

The port of Alexandria possesses more distributing facilities than all other Egyptian ports put together, as before indicated.

Answer to Question No. 16:

This port had its breakwater, quays, sheds, etc., built by borrowed public money, known as the privileged debt, issued at £100, present price £99, and paying 3½ per cent. upon the £100. The revenue of the port is applied to the payment of the dividend and annual drawings to pay off said debt.

Answer to Question No. 17:

Inwards: coal, iron and Manchester goods.
Outwards: cotton, grain and cotton seed.

Answer to Question No. 18:

The foregoing answers will at once show that the conditions at this port will prevent its being compared with other ports throughout the world.

Port Said.

Answer to Question No. 1:

To the transit steamers through the Suez Canal.

Answer to Question No. 2:

There are none.

Answer to Question No. 3:

None of these exist.

Answer to Question No. 6:

The so-called quay is regulated by the canal company's officials.

Answer to Question No. 7:

Never.

Answer to Question No. 8:

None.

Answer to Question No. 10:

The landing charges are paid by the consignees of goods, etc.

Answer to Question No. 11:

No.

Answer to Question No. 12:

There is only a steam tramway belonging to the canal company and running daily from Port Said to Ismailia and *vice versa*. It has no connection whatever with docks, and is only used for passengers and mails.

Answer to Question No. 14:

Lighterage, 5 ps. per ton.

Answer to Question No. 15:

That of receiving from the east and forwarding to Syria, Turkey and Adriatic ports all sorts of goods, which are trans-shipped here.

Answer to Question No. 16:

No.

Answer to Question No. 17:

Welsh coal; about 1,000,000 tons imported annually.

Yearly Return of Tonnage passing through the Suez Canal from its Opening up to and including 1895.

YEAR.	Number of Vessels.	Gross Tonnage.	Net Tonnage.
1869,	10	10,557.61	6,576.00
1870,	486	654,915.02	436,609.37
1871,	765	1,142,200.46	761,467.05
1872,	1,082	1,744,481.32	1,160,743.54
1873,	1,173	2,085,072.61	1,367,767.82
1874,	1,264	2,423,672.22	1,631,650.14
1875,	1,494	2,940,708.45	2,009,984.09
1876,	1,457	3,072,107.01	2,096,771.61
1877,	1,663	3,418,949.72	2,355,447.69
1878,	1,593	3,291,535.38	2,269,678.31
1879,	1,477	3,236,942.32	2,263,332.19
1880,	2,026	4,344,519.89	3,057,421.83
1881,	2,727	5,794,491.19	4,136,779.77
1882,	3,198	7,122,125.68	5,074,808.88
1883,	3,307	8,051,307.30	5,775,861.79
1884,	3,284	8,319,967.36	5,871,500.92
1885,	3,624	8,985,411.80	6,335,752.98
1886,	3,100	8,183,313.15	5,767,655.84
1887,	3,137	8,430,043.20	5,903,024.09
1888,	3,440	9,437,957.32	6,640,834.44
1889,	3,425	9,605,745.48	6,783,187.12
1890,	3,389	9,749,129.09	6,890,094.41
1891,	4,207	12,217,986.41	8,698,777.36
1892,	3,559	10,866,401.46	7,712,023.61
1893,	3,341	10,753,798.15	7,659,068.10
1894,	3,352	11,283,854.72	8,039,175.27
1895,	3,434	11,833,637.33	8,448,383.01

CARDIFF (Wales).

[The report of ANTHONY HOWELLS, U. S. Consul.]

Answer to Question No. 1:

The terms "Cardiff" and "success" are deemed synonymous in this country, and one often hears the remark that its phenomenal progress stamps the place as being quite an American sort of city; nor can we demur to the comparison.

The antiquity of the city takes us back to the Roman invasion, when Aulus Didius established a Roman station here, the name Cardiff being an anglicized form of the term "Castra Didii;" but its commercial history does not extend beyond the present century, and is strictly contemporaneous with the development of the mineral wealth of the South Wales coal field.

I find that the government census returns give for the year 1801 a population of 1,018, whereas in 1891 the inhabitants numbered 128,849 and to-day are computed at nearly 160,000. Cardiff is the leading coal port of the world, and owes its remarkable success entirely to its proximity to the Welsh coal basin, from which excellent steam coal is obtained. The demand for Cardiff coal for steam purposes has been so great that local enterprise by way of dock facilities has been unequal to it, with the result that the freighters have themselves built what is known as the "Barry dock," within the port, but distant nearly eight miles from the city of Cardiff.

The land for the most part belongs to the Marquis of Bute, whose noble father in the year 1839 completed the Bute docks, since when the shipping has been on a large scale and has increased by leaps and bounds; and the ownership is even now practically in the hands of Lord Bute, albeit, by virtue of powers contained in an act of Parliament of the year 1886, it was incorporated into a public company, under the title of the "Bute Docks Company, Cardiff." The purchase price was £3,500,000 sterling, or about $17,500,000; and it is noteworthy that the whole of the 4 per cent. debenture stock, $4,000,000, issued at par, was subscribed for within an hour from the time that the lists were opened. Besides the Bute docks there are the Penarth docks, owned by another limited liability company; and an idea of the full market value of these properties may be adduced from the fact that during last year the city corporation elaborated a scheme to acquire them at an estimated cost of over $40,000,000. By adding thereto the value of the Barry dock, a new dock soon to be opened by the Barry Company, also another new dock in course of construction by the Bute Docks Company, the total value of these properties would exceed $50,000,000.

The import trade is confined chiefly to lumber (a considerable portion of which is fit for use as props in the coal mines) and Spanish iron ore for the iron and steel industries; also grain and flour, the general merchandise being comparatively inconsiderable.

Answer to Question No. 2:

A natural harbor exists, and the dock entrances to the port are sheltered from all winds, and the largest vessels afloat can be accom-

modated. Being within easy distance of the coal field, which crops out at Merthyr, twenty-four miles distant, at a height above the sea level of 568 feet, an easy down grade from all points permits of very heavy train loads of coal being brought speedily to the docks; and, as vessels can be docked at any time, irrespective of tides, and steamers can be loaded into two or more hatchways simultaneously at the rate of 600 tons per hour, with the minimum of breakage, the despatch is all that may be desired. It is claimed, with a show of reason, that Cardiff is the natural port for the populous midlands district; but it must be confessed that the demands of the coal and patent fuel export trade have occupied the minds of capitalists in this district, and that comparatively little has been done to foster the import trade, although at present the best facilities are offered, and there is every evidence of an earnest desire to make it commensurate with the exports.

Answer to Question No. 3:

It must be conceded that foresight and enterprise have been displayed by those upon whom has devolved the task of providing the magnificent dock accommodation by means of which the enormous trade of the district has been developed; nevertheless, it is beyond question that private ownership has been responsible in past years for grievances under which the freighters groaned. Now, however, competition has naturally brought about a state of things which may be termed satisfactory in respect of management and control.

Answer to Question No. 4:

The Bute interests at the Cardiff docks may be more clearly understood when it is known that the Marquis of Bute is "lord of the manor" of the lion's share of the steam coal district, and that his manorial rights include royalties on the coal produced. With a royalty of eight or twelve cents, as the case may be, and a clause in the mining lease that all coal raised under such lease shall be exported from Cardiff in preference to any other Welsh port, it will be seen that his lordship and his trustees have had all the stimulus required to develop the docks. But they have failed to keep pace with the demands, and unquestionably if the ownership had been public a better growth would have been obtained, and, instead of a scattered port, as at present, the docks would have been grouped, to the advantage of everybody concerned.

Answer to Questions Nos. 5, 6 and 7:

I have already shown that the ownership, although ostensibly public, is practically of a private nature as regards the Bute docks. The Penarth docks belong to a company which is to all intents and purposes identical with the local railway, by whom the docks are controlled, and the same remark applies to the Barry dock. In the last case its success has been assured by the fact of its having been promoted by revolting freighters, who spent enormous sums in obtaining parliamentary leave and afterwards in constructing the largest single dock in the world; and it is noteworthy that their stocks return ten per cent. per annum, and so satisfactory is their reserve fund that the market quotations are more than double the original prices.

Answer to Questions Nos. 8 and 9:

The desire for a harbor trust or board of control has manifested itself for a number of years past, and it had been fondly hoped that this would have been accomplished last year; but the consummation so devoutly wished for by a considerable section of the public is not yet within sight. In the month of November, 1892, a committee was appointed by the city corporation to inquire and report to the council on the feasibility and advantage of forming a harbor trust; and shortly afterwards the committee reported that to all of the inquiries made to the various interests concerned favorable replies had been received, and that it was therefore desirable to proceed with the formation of such a trust as would be for the benefit of the town, trade and port of Cardiff, as it was the first time in the history of Cardiff that the different ownerships had expressed themselves willing to combine. The experiences of the Dublin Board, Belfast Board, Clyde Trust, Greenock Trust, Harwich Board, Swansea Trust and Dundee Trust were cited, and it was submitted that, with a Board fully representative of all the interests of the port, a great development might be made, the import and export trades fostered and the ratable value of the town of Cardiff increased. It was pointed out that one of the advantages of a trust would be that the undue competition would be done away with; and, if the Board were a fully representative one, there would always be a balance of power there to see that each trade and interest was carefully represented and fostered, and that the saving effected on the administration charges and parliamentary costs would go to the reduction of dues, thereby offering inducements for an increase of trade, as with a trust surplus

profits generally are devoted to dock extension and in every way necessary to encourage manufactures which are usually most prosperous on sea-board localities. The prices to be paid were based on twenty-five years' purchase at four per cent., taken on three years' earnings; and it was proposed to borrow some three-fourths on the properties, and to pledge the rates for the remaining fourth of the capital, which would soon have to be augmented for development of the port by increasing the dock capacity and utilizing land on the foreshore now valueless but prospectively of the greatest importance.

However, just as it was thought that matters had been brought to a head, conflicting interests gave a check, and before a settlement could be arrived at the time limit for parliamentary notices for the year 1894 expired, and negotiations were broken off. When these will be resumed it is difficult to foretell; but what I am trying to enforce is that the trend of local opinion is in favor of a public trust, and that on every hand it is lamented that such a step was not taken half a century ago. From each of the trusts cited above affirmative replies were received as to the advantages of public ownership, and in most cases it was shown that a considerable amount had been expended on the respective properties out of revenue, and in several instances the capital decreased. The broad representative character of the constitution of the Clyde Trust is most favorably regarded and was much commended in the London press during discussions anent the formation of a general conservancy board for the Thames; and nowhere is it recognized more clearly than at Cardiff that such a trust would have been an incalculable boon to the port.

Answer to Question No. 10:

The docks rates vary from 2 to 18 cents per ton, and the loading charges (trimming coal) 6 to 12 cents per ton of cargo, wharfage and labor charges being comparatively low. It is claimed that the charges on the whole are no less than 30 per cent. lower than any other port in the kingdom, the rate of dock dues per vessel being 18 cents per ton register, and steamboats bunker here at greatly reduced charges. There are no town dues.

Answer to Questions Nos. 11 and 12:

There are direct railroad connections with the docks from main lines, so that vessels can discharge and receive freight direct from the trains, the railroads in the vicinity of the docks forming part

of the dock property in each instance. The four railroads running into the port are the Great West (Trunk) line, the Rhymney Railway, the Taff Vale Railway and the Barry Docks Railway, each of which is controlled by a limited liability company. The legal maximum railway rate for conveying coal from the collieries is .875 of a penny (two cents) per ton per mile; but all large exporters have special rates, as, for instance, one large firm, whose collieries are situated nearly twenty miles from port, are charged, according to contract, 23 cents only per ton.

Answer to Question No. 13:

The railroad connections provide the necessary competition to keep down the freight charges, and one of the first consequences of the opening of the Barry Docks Railway, promoted by freighters, was to bring about a war of rates, which resulted in an appreciable reduction. I may add that the local lines are connected with all the trunk lines of the country, and herein is afforded an opportunity for enormously increasing the volume of imports.

Answer to Questions Nos. 14, 15, 16, 17 and 18:

There is no system of lighterage at this port, but a uniform charge of eight cents per ton is enforced for the use of barges in discharging ballast.

In view of the undoubted fact that in other ports in the United Kingdom having far less natural advantages than Cardiff harbor trusts have been the means of largely developing the ports concerned, and that it is recognized generally here that, unique though the progress of the port of Cardiff has undoubtedly been, it might still have been greater under other circumstances, — I am forced to the conclusion that public interests are best served by trusts, wisely controlled; for it goes without saying that the community of interests between the port and city is made very close, and, besides proving mutually beneficial to manufacturers, shippers and ship owners alike, tends to benefit commercially the city to a far greater extent than when the docks are privately owned, as in the latter case revenue is apt to be treated as legitimate profit, instead of for adding to or reducing the capital, according to the necessities of the case.

U. S. Consulate, Cardiff, Aug. 13, 1895.

COPENHAGEN (Denmark).

[The report of ROBERT J. KIRK, U. S. Consul.]

Previous to the legislation which resulted in the establishment of the free port of Copenhagen, she is acknowledged to have been one of the most expensive ports in Europe; now she ranks among the cheapest. To this fact and to her favorable position as a distributing centre, her situation on the Sound, the entrance to the Baltic Sea, being one of the most frequented ship routes in the world, must be attributed more than to any other circumstance whatever of commercial success she enjoys.

Of course the management and control of the docks, wharves and quays enter as a factor, but to a much smaller degree. This management is in the hands of experienced business men, fully alive to the sharp competition of the times, who put forward every effort to facilitate business.

The ownership of wharves and quays is partly public and partly private, and up to this time the system has worked in perfect harmony. The warehouses in the whole port are private property, except those belonging to the custom house. The quays themselves are partly private and partly belong to the harbor committee, but a private warehouse may be erected on the public quay.

Private warehouses are under no control except such rules as their owners may adopt; the warehouses belonging to the custom house are, of course, controlled by the custom authorities. As to the comparative merits of the private and public ownership of docks and quays, I am informed by an old established firm that charges at the public quays are generally less than at private ones, say 16⅔ ore per net registered ton, as compared to 25 ore. Within the free port the use of wharves and quays is regulated by the Freeport Company.

Outside of the free port this use is regulated by the harbor council, consisting of the lord mayor, who is president, and two members appointed by the king, on recommendation of the minister of the interior, for a term of six years, six members elected by and from the city council for a term of six years, and four members elected by the Rigsdag for a term of three years, two by each house. This council decides all matters pertaining to the harbor, and its ruling must be had on all questions concerning the relations of the harbor authorities with the navy department, or the city, and in the matter of regulations for the management of the harbor. Each member has the right to make propositions and complaints. The management of the harbor is conducted by a port captain, appointed by the

minister of the interior, on the recommendation of the harbor council. He is responsible for the good order maintained in the roads and harbor, in conformity with the regulations and the annual budget. He attends to the correspondence and accounts, and is chief of the harbor police and employees. In the absence of the port captain the harbor master represents him. The interior harbor, the bridges and the roadsteads are under the jurisdiction of the harbor authorities aforesaid. The harbor is divided into four districts, for each of which a sub-harbor master is appointed, to keep order in the docks and at the quays.

There has never been interference with the private ownership of the docks, wharves and quays, but the State is supreme, and can at any time take charge of same.

Landing expenses are shared both by the vessel and cargo, the quay money being paid by the vessel and the warehouse charges by the cargo. Within the territory of the free port the revenue of the Freeport Company comes from charges levied on the cargo for storage and handling.

The State railroad, both in and out of the free port, connects directly with the docks, so that vessels can discharge and receive freight direct from the trains. The Danish railroads being in direct communication with all parts of the continent and Norway and Sweden, through trains can be sent to any point desired; but the great bulk of the traffic, both in and out of the country, is done by steamships. This follows naturally from the fact that Copenhagen is an insular city.

The system of lighterage is as yet in a state of crudity. There are two companies, but they are not of much importance in estimating the advantages and facilities of the port. Their charges in the harbor are 85 ore (23 cents) and in the roads Kro. 117 (31 cents) per ton.

As a distributing centre there is no city of the Baltic or perhaps in Europe which can surpass Copenhagen. In the free port can be seen the latest and most practical appliances of machinery in loading, unloading, handling and storing cargo. Here the electric crane is a distinct feature; of these there are about a dozen, moving on a track of their own along the edge of the docks. Their capacity is one and one-half tons. In a test before two of the members of the Massachusetts Board, whom I had the pleasure of accompanying on a visit to the free port, one of these cranes took up a beam of walnut, weight about five hundred pounds, from the second floor of the warehouse, swung round with it and lowered it to the water in the dock, thirty-two feet below, in twenty-two seconds. Those cranes are built up to the level of the second floors of the warehouses.

The unloading and storage of grain is done altogether by machinery. The grain is carried by a chute from the deck of the ship to a belt running in a tunnel beneath the wharf. By this belt it is taken and emptied into a bin in the basement of the warehouse, and from this bin a second belt raises and distributes it to the loft desired. To load a vessel the grain is carried direct by chute to the hold of the vessel. In case the loft, where the grain may be, is not sufficiently elevated to cause it to run freely through the chute, it is first lifted by elevator to a bin in the top of the warehouse, a hundred feet above the wharf. Electricity is the motive power employed.

Agriculture being the chief industry of the country, grain is the chief staple, while butter is the greatest item of export. For the last two or three years Denmark has paid great attention to stock raising, and now exports large quantities of dressed pork and beef, which go chiefly to England.

U. S. CONSULATE, COPENHAGEN, Nov. 1, 1895.

DUNDEE (Scotland).

[From the report of JOHN M. SAVAGE, U. S. Consul.]

Originally the harbor affairs were administered by the town council of Dundee, under royal charters granted at various times, and particularly under that of Charles I., dated the 14th of September, 1641, and continued to be so administered down to 1815. For some time previous to this the harbor had been neglected and allowed to fall into disrepair, a large proportion of the harbor revenue being diverted from harbor purposes and applied to the general expenses of the city. In proof of this fact, the gross sum received from harbor dues for fifty years, prior to 1815, amounted to £38,696 3*s.* 4½*d.*, during which time there was expended on piers, etc., £9,468 10*s.* 9*d.*, leaving £29,227 12*s.* 7½*d.*, which was applied to the general uses of the city.

In 1814 considerable attention was directed to the question of improving the harbor and of obtaining a proper representation of the various interested classes on the harbor management. At this time the magistrate and town council had promoted a bill in Parliament for improving the harbor and for other purposes. This scheme was deemed unsatisfactory by the leading merchants, manufacturers, ship owners, and others interested, and public meetings were called, with the result that the proposed measure was abandoned, and a bill was passed constituting certain parties commissioners, who had

power to execute certain improvements and to levy rates, etc., which act was to continue in force for twenty-one years. In 1830 an act was passed repealing the previous acts, and incorporating the trustees of the harbor of Dundee, which trustees by that name should have perpetual succession. By the terms of this act the harbor property was vested in the trustees, and they were authorized to compensate the city for the property taken over by them and for the right to levy dues, which after considerable negotiation was fixed at £27,500.

Various acts were from time to time passed, increasing and enlarging the power of the trustees; and in the year 1869 an act was passed under which the constitution of the Harbor Board was altered, and the membership was enlarged from twenty-one to thirty-two. In 1873 an act was passed transferring the Tay ferries, a large and important steam ferry across the river Tay, from certain mortgagees who held possession to the harbor trustees, the consideration being £20,000.

The harbor trustees, as stated, consist of thirty-two members, as follows: six from the town council, three from the nine incorporated trades, six from the Guildry Incorporation, one from the three united trades, one from the Seamen's Fraternity, four from the county of Forfar, three from the Chamber of Commerce, three from the ship owners, three from the harbor ratepayers and two from the municipal electors.

Of the six members representing the town council, the lord provost and the first, second, third and fourth bailies have seats at the Board by virtue of their office, while the sixth representative is elected annually. The lord dean of guild, the boxmaster of the fraternity of masters in Dundee and the convener of the nine incorporated trades also sit at the Board by virtue of their office, the other twenty-four members being elected annually.

At the time of the agitation for a transfer of the harbor from the municipal authorities to an independent corporation, it was urged that the harbor was not a proper source of revenue to the city; that the whole surrounding country had an equal interest, and that it was unfair to enrich the corporation at the expense of the harbor, which suffered in consequence. The chief advantage derived from the present condition of affairs is, that the revenue from the harbor is applied to the payment of the interest on the money borrowed for harbor improvement, to the creation of a sinking fund, to the maintenance of the harbor in a first-class condition and to the working expenses thereof, and that a sufficient revenue is only collected to provide for these purposes.

The various railways have sidings alongside the quays, so that it is possible to load and unload ships from the cars, although this is only done in case of through rates. If you desire any further or specific information, I shall be glad to serve you to the best of my ability.

U. S. CONSULATE, DUNDEE, June 27, 1895.

DUNKIRK (France).

[From the report of BENJ. MOREL, U. S. Consular Agent.]

Dunkirk is the most northern town of France; the success of this port and constant progress of its trade are principally due to its exceptionally favorable geographical position, as it is the nearest port to the manufacturing and industrial towns of the north-east of France.

It is in direct communication with those various large places, both by railroad and by canal; all the quays are, by railroad, in communication with the station, and the lighters get into the seven wet docks alongside the vessels through three different waterways. Those facilities, of course, contribute to a large extent to the development of the trade.

The docks, quays, wharves and dry docks are built by the government, with the financial help of the town and of the Chamber of Commerce, and are under the exclusive control of the government, represented by the bridges and roads department.

In the various services, such as towage, slipway, gridiron, cranes, the yeon the quays, commercial guardians, loading, discharging gear, sheds e th warehouse, actually are, or will be as soon as definitely customs 27 1d, all managed by the Chamber of Commerce. Up to the organized ver fifty millions of francs have been spent to do the present, d siderak s; same are paid by the government, but the money is harbor wor arbor a intly by the town and by the Chamber of Commerce, advanced jo d classes, and the needed funds to pay the interest and charges through loan d town are secured by levying on the vessels visiting the on such loans e harbor with the sanction of the government. These taxes, port some dues sfactory s of "municipal tax" and "Chamber of Commerce under the name thers intogether to 70 centimes per registered ton, while a tax," amount to t the pro s per registered ton, called "harbor dues," is spectax of 10 centime stituting ce to cover the expenses referring to the harbor's ially appropriated implements.

The Chamber of Commerce, being placed directly under the gov-

ernment control, offers better guarantee than any private party of a good management for public interest. Any benefit made out of said management must be applied to the improvements of the harbor and to the increase in facilities of all kinds, or be applied to an abatement in the above-named taxes.

This, of course, constitutes a most serious advantage over private ownership and management. The use of the docks and wharves is regulated by the government.

According to the custom of the port, the cargo is received direct from ships' tackles by the receivers, and is sent direct into trucks or into lighters, or put into stores; it may also remain at quay or be placed in the shed for some while, no charge whatever being levied on it, except the usual cost of discharging, the watching and tarpaulings when landed on the wharf, or the rent of the sheds, according to tariff.

In the course of next year the new entrances to our docks (which are now being made) will be completed, and vessels of all sizes will go straight in dock upon arrival, without lightering, whatever may be the draught of water. Up to that time, however, ships drawing twenty-three to twenty-four feet have to lighter, and the lighterage is done either in the roads by special lighters, at the cost of about five shillings per ton, or into the harbor at half cost, at a special quay built where ships lie in soft mud with ten feet of water around them at low water.

When according to the bill of lading the lightering expenses are to be borne by the cargo, it has been arranged with mutual consent that the said expenses would be paid in proportion by the Chamber of Commerce, corporation of town, ship brokers and the receivers of the cargo; the object of this being to manage the trade at this port, and lessen the charges to the largest possible extent.

U. S. CONSULAR AGENCY, DUNKIRK, Aug. 8, 1895.

FIUME (Austria-Hungary).

[From the report of G. GELLETICH, U. S. Consular Agent.]

Answer to Question No. 1:

I attribute the success of our port in competition with other rival ports to facilitations granted by the royal Hungarian government, which tries with all possible care to get the trade of Hungary in Fiume.

Answer to Question No. 2:

The physical features of our harbor enter into its success, in that it is well provided with quays, wharves, warehouses and everything used for the trade of a first-class port; there are two lines of railroad, the State Railroad through Hungary and the Sudbalm Company line through Austria; coasting line steamers, well managed, as the distance is shorter than to Trieste.

Answer to Question No. 3:

Being a port under the Hungarian State property and administration, the duty of the Hungarian government is to help the trade with its power to compete with other ports.

Answer to Question No. 4:

Same as No. 3, there being no private property here.

Answer to Question No. 5:

The port of Fiume is the property of the royal Hungarian State.

Answer to Question No. 6:

The port wharves, quays, etc., are administered by the royal Hungarian marine government, which appoints the harbor master and other employees for the harbor service; the port rules and regulations are made out by the said government.

Answer to Question No. 7:

No private ownership in this port.

Answer to Question No. 8:

Commercial advantages under State administration are great; only the State ownership could give such facilities for the port of Fiume; impossible for private to do so.

Answer to Question No. 9:

No former owners existed; the port was constructed new, with State funds.

Answer to Question No. 10:

The principal part of the revenues comes from charges on the vessels.

Answer to Question No. 11:

There is a direct railway connection with the wharves and quays from the main lines, and vessels could discharge and receive freights direct from trains.

Answer to Question No. 12:

No local railroads exist here.

Answer to Question No. 13:

The greatest part of the success of our port is due to the Hungarian State Railroad. The administration of the State Railroad has accorded great facilities and reduction of freights for merchandise brought to and from Fiume.

There are two lines of railroads, one belonging to the Hungarian State through Hungary, and the other belonging to the Sudbalm Company through Austria.

The Hungarian State Railroad charges for ten-ton loads from Budapest to Fiume one hundred and sixty-eight florins. When the goods arrive in Fiume and are shipped on board vessels for exportation, the railroad administration returns to the merchant forty-eight florins for the ten tons of goods.

Answer to Question No. 14:

No lighterage system in our port; all the loading and landing operations are done alongside the quay.

Answer to Question No. 15:

The terminal and distributing facilities which this port possess are the extensive lumber and timber yards in proximity to the quays and wharves, and a number of bonded warehouses where the goods lie waiting shipment.

Answer to Question No. 17:

The chief staples of traffic at our port are as follows: importation goods, — rice, petroleum, coal, pig iron, wine, iron ore, jute, etc.; exportation goods, — wood (staves, timbers, deals, etc.), grains, flour, beans, etc.

U. S. CONSULAR AGENCY, FIUME, Aug. 6, 1895.

GHENT (Belgium).

[From the report of HENRY C. MORRIS, U. S. Consul.]

Immediately upon receipt of the instructions requesting this report, a translation of the interrogatories was furnished to the local authorities; these latter have kindly submitted to me answers embodying most of the information required; only in a few instances are their replies supplemented or explained in accordance with my personal observation.

Answer to Question No. 1:

The success of the port of Ghent must be attributed to the perfection in every detail of its appurtenances and appliances, such as wharves, sheds, terminal facilities, trans-shipping machinery, lighting and dry docks; to the economic prosperity of the city of Ghent, a great industrial and commercial centre; to the very favorable schedule of harbor dues, which are much more reasonable than in competing ports.

Answer to Question No. 2:

The success of this port is largely due to its location. On the one hand, Ghent is the centre of a network of railway lines, it is situated in the heart of an agricultural district and is engaged in large manufacturing industries; on the other hand, it is one of the nearest continental ports to London, whither it sends daily large cargoes of natural and manufactured products. In return, it receives much merchandise for distribution in Belgium and north-eastern France. Its local physical features are also very favorable, while being able to conduct extensive trade by its sea canal. It is likewise the centre of a system of inland canals, by which it collects and distributes the merchandise brought into its harbor.

Answer to Question No. 3:

As all dock and harbor management in Belgium is public, it is impossible to draw any comparison such as is involved in this question. The public authorities are always presumed to act for the best and for the ultimate success of their charge.

Answer to Question No. 4:

This question must be answered in a manner similar to the preceding. All maritime installations are public property. The port is managed in the general interest of the country, rather than as a commercial enterprise. The public authorities watch carefully over the maintenance of the tariffs, regulations and customs of the port. They are generally in a position to make sacrifices, if necessary, to maintain the prosperity of their port.

Answer to Question No. 5:

The ownership and control is entirely public, the docks and appurtenances belonging to the city of Ghent and being under its management.

Answer to Question No. 6:

The city council has entire control of the docks, wharves, quays and all appurtenances of the port; it is the final arbiter of all questions relating thereto.

Answer to Question No. 7:

There is not, and never has been, strictly speaking, any private ownership or control. The present system has existed unchanged in its general features since 1792. The general and municipal authorities always have been supreme. For these reasons, it is impossible to answer the questions.

Answer to Question No. 8:

Private ownership not existing, a comparison cannot be made. There is not any experience upon which to base a conclusion.

Answer to Question No. 9:

This question, involving, as it does, a review of Belgian legal procedure, would demand for a satisfactory answer an exposition of details exceedingly tedious and complicated. In brief, however, it may be said that the property was appropriated by public authority by right of eminent domain and for reasons of public utility. The former proprietors were indemnified according to Belgian legislation. The public authorities supplied the necessary funds.

Answer to Question No. 10:

Only one single obligatory due, or charge, exists at this port. It is the wharfage due, and gives a vessel the right of mooring and of proceeding to all the operations of loading and unloading. The cargo is not taxed. The administration of the port places at the disposition of the ships sheds, appliances, lights and warehouses, at charges established according to a fixed tariff. The use of the machinery and of sheds is optional.

Answer to Question No. 11:

Yes. The port is connected by railway with all the State and international railway lines. There are several special railway stations. Tracks run along the quays and wind around or under all sheds and warehouses. Steam and hand cranes overhang the tracks, and permit the loading and unloading direct of vessels from trains, or *vice versa*, or from or onto the docks.

Answer to Question No. 12:

There is railroad communication, as previously stated, but it forms a part of the general railway system. The Belgian government owns and manages all these lines and their stations; the latter are also used by the private railway companies.

Answer to Question No. 13:

There exists a close relationship between the prosperity of the port and the railway. Under present commercial conditions one is not possible without the other.

Answer to Question No. 14:

Belgium possesses innumerable canals and many rivers, upon which transportation by boat is highly developed. This service of boats is in the hands of private companies or persons, who contract according to circumstances. Competition of boatmen among themselves always assures reasonable lighterage charges when this expense becomes necessary.

Answer to Question No. 15:

Fully as good, if not better. The terminal arrangements are according to a highly practicable system.

Answer to Question No. 16:

Almost all the ports of Europe have expended large amounts of public funds to improve their harbor, docks and appliances. The results have fully warranted these outlays.

Answer to Question No. 17:

The chief articles imported at Ghent are lumber, coal, raw textile materials, oats, wheat, nitrates, sulphates and raw cotton.

After the completion of the canal improvements now under progress, Ghent will become the principal continental centre for the importation of raw cotton.

The principal articles exported from here are raw mineral substances, stones, vegetables and fruits, phosphates, sugar, beet roots, coal, waste papers, rags and threads.

Answer to Question No. 18:

In reply to this general inquiry, it may be profitable to give a brief description of the port of Ghent. Fortunately for our purpose, Mr. E. Braun, engineer-in-chief of the city, has lately published an article upon this subject. We give herewith a translation: —

The port of Ghent is connected with the navigable Scheldt by a canal, commencing at Terneuken, which measures about 20 miles in length. Its cross-section measures 55¾ feet at the bottom, 183¾ feet at the water level and 21⅓ feet in depth. The entrance is by the lock at Terneuken. The canal is divided into two different stages by a lock located at Sas de Gand. A convention has just been concluded with the Dutch government for th

construction of a new lock at Terneuken, by which a single level will be established throughout the length of the canal, with uniform depth of 24½ feet. The width of the canal at the bottom is to be 69 feet. The lock will be 51⅛ feet in width and 459 feet in length. The work incident to this important improvement will be undertaken immediately, if, as it is now confidently expected, the Legislature votes the necessary credits.

The port of Ghent includes four basins. First there is the basin of commerce, about 5,250 feet in length and 32 acres in area. This basin has three different widths: 197 feet for the first 1,640 feet, 361 feet for the 1,312 feet following and 295 feet for the remainder of its length; next is the lumber basin, which measures 721¼ by 380½ feet, or about 274,360 square feet in area; then the Tolhins basin, which is 1,312 feet in length by 414 feet in width, with an area of 543,168 square feet; and finally the basin of the outer harbor, which measures 3,641 feet in length, by an average width of 295½ feet, having an area of 24¾ acres approximately. The total area of all the basins is therefore about 74 acres. The length of the quays is 14,452 feet. The length of accostable embankments is 6,104 feet. The area of covered sheds is about 5 acres. The area of warehouses is likewise 5 acres. Finally, there exists a four-story warehouse, occupying ⅝ of an acre.

The platform of the quay of the outer harbor measures 295⅛ feet in width, including a track for the cranes, two railway tracks for loading and unloading, warehouse sheds 141 feet in width, two additional railway tracks, two switching tracks, and finally a wagon road 50 feet in width. On this platform are built three warehouse sheds with cellars and upper stories, two warehouse sheds of several stories without cellars and one covered shed.

Each of the warehouse sheds measures 328 feet by 141 feet. Those with cellars cost $2 per square foot; without cellars, cost $1.67 per square foot. All are furnished with hydraulic elevators. The covered shed measures 755 by 76 feet, and cost 51 cents per square foot. Three ton cranes, moved by steam, run on the track alongside the quay; they cost $2,509 each. Finally, a movable 25-ton crane completes the outfit. This crane is constructed so as to discharge by dumping directly into the hold of vessels cars loaded with coal, gravel, mineral, etc. It cost $8,685.

The lumber basin is surrounded by stone embankments which rest on piles, at the water level, 6⅝ feet in width; upon this piling are arranged at short intervals discharging piers with perpendicular walls. This arrangement permits steamers to discharge before the piers and sailing vessels before the stone embankments. It is highly appreciated by vessels engaged in the lumber trade.

The platform contains covered sheds 78¾ feet in width, costing 43 cents per square foot, a road 33 feet in width, two railway tracks and grounds rented for lumber storage.

The basin of commerce is surrounded partially by perpendicular quays, partially by accostable embankments. There exists on the left bank of this a quay wall, constructed so as to permit a draft of 15 feet. When, some years ago, there was a question of deepening the basin by 6⅝ feet, in order not to be obliged to reconstruct these old walls, which would have been very ex-

pensive, there were established before these latter discharging wharves, 19¾ feet in width, formed of piles made solidly, a system of iron ties, stays and props, surmounted by iron plates; upon these are built the masonry arches and pavement. The cost of this discharging wharf per running foot was $23.53.

Trans-shipment is effected along the old quays of the basin of commerce by means of three cranes and three elevators operated by water pressure (Armstrong system).

The lighting is by means of arc lamps suspended from electric masts. Furthermore, to each of these masts are attached portable conductor wires and incandescent lamps, permitting the lighting of the interior of vessels during loading and unloading. A new quay wall 1,312 feet in length has been built on the right bank of the basin of commerce. It presents this peculiarity, that it is constructed entirely in concrete masonry except the uppermost course, which is in cut stone. It was built with a view to a draft of 23 feet; the cost was exceptionally cheap, — $35.30 per running foot.

The employment of concrete cement had certainly some effect towards this result, but the principal cause of the great difference in price with other similar works arises from the system of foundations adopted.

The present appliances of the port of Ghent must be considered as only temporary. They will soon be replaced by a central motor, operating all the various machinery. The city has for this purpose recently opened a competition, leaving to competitors their choice between water pressure, compressed air and electricity. Four propositions based on water pressure, two based on the employment of compressed air and seven based on the employment of electricity have been received. The most favorable projects based on water pressure and on electricity are submitted at prices almost identical for the first installation. The most favorable proposition based on compressed air is much dearer than either of the two others, and this difference is not compensated by any saving in the cost of operation; the contrary is, indeed, the case. The choice between the two first projects is, then, subordinate to the question of cost of operating and considerations of convenience. It appears, from an examination based on different hypotheses of traffic, that the electric installation would leave a certain margin in economy of combustibles, but that this economy might be offset by the amount of other costs. Besides the question of expense of operation and of maintenance, the electric installation presents, however, certain incontestable advantages, such as unity in the installation of motor power and lighting, the same machinery serving both purposes. Electricity is also completely free from the influence of frost. Finally, in the event that electricity should be introduced into the city, it would be possible to suppress the special power house.

Are these advantages sufficiently important to give electricity the preference? The electric apparatus at Hamburg, Rotterdam and Copenhagen are still too new to enforce absolute conviction. We believe, however, if, as everything seems to foreshadow, the trials made in these ports should be favorable, that electricity will also finally win the day at Ghent.

U. S. Consulate, Ghent, Sept. 13, 1895.

GLASGOW (Scotland).

[From the report of ALLEN B. MORSE, U. S. Consul.]

The harbor of the port of Glasgow has been made by the deepening of the river Clyde to the Broomielaw of Jamaica Street bridge, in the centre of the city, for a distance of 18 miles down to near the entrance of said river into the Firth of Clyde. The harbor proper, with docks, extends along the river for a distance practically of over 2½ miles. It is, for this district, from 400 to 500 feet wide, and, besides the natural basin of the river, contains three tidal docks, one of them the largest in Scotland. It is divided into two parts, known as the upper harbor and lower harbor; the former extending from Albert bridge to Glasgow bridge, the latter from Glasgow bridge to the mouth of the river Kelvin. The quays on the north bank of the river are as follows: in the upper harbor, custom house quay, extending from Victoria bridge to Glasgow bridge, Broomielaw or steamboat, Lancefield, Finniston and Stob-Cross quays, Stob-Cross ship docks, Yorkhill wharf and Govan and Partick wharf. On the south side from Glasgow or Jamaica bridge, downward, are Clyde Place, Windmillcroft, Springfield, Terminus, Mavisbank and Plantation quays. The water area is about 180 acres. The average depth at high water of spring tides varies in different parts from 19 to 35 feet, the shallowest berth being in Kingston and the deepest in Cessnock dock. Over the rest of the harbor the ordinary depth is from 24 to 30 feet. The total length of quayage is 14,793 yards, of which half is allotted to various lines of steamers trading with different ports of the world. The rest is available and used for general purposes of trade. Yorkhill wharf is set apart for the discharge of timber, and has large wood storage yards connected with it. At its west corner are lairs and slaughter-house for cattle from the United States. At Shieldhall, on the south side of the river, west of Govan, are similar provisions made for cattle from Canada. Terminus, Springfield and Mavisbank quays on the south side, and part of Queen's dock on the north side, are almost entirely given up to loading and unloading ore and coal.

Kingston dock on the south bank of the river, behind Windmillcroft quay, was built in 1867, the first constructed upon the river. It is an oblong basin with 5 acres of water space, surrounded by a timber wharf, giving 830 lineal yards of quayage. The site cost $200,000, while over half a million dollars was expended in its construction.

In 1880, after eight years of work, the Queen's dock on the north

side was fully completed. It comprises three basins, the north 1,866 feet long by 270 wide, and the south 1,647 feet long by 230 wide, with a quay between them 195 feet broad, and an outer, 695 feet wide and 1,000 feet in length. The entrance is at the south-west corner, and about 100 feet in width. It is crossed by one of Armstrong's hydraulic swing bridges, 40 feet 6 inches wide and 181 feet 6 inches long, and constructed to carry a rolling load of 60 tons on any part of its roadway. The total cost of the dock was about $7,000,000.

Cessnock dock, back of Plantation quay, was the last to be constructed, and has just been completed. The entrance is at the north-west corner, and leads into a large basin measuring 700 by 685 feet, and with a 120-ton crane on the centre of the quay wall to the west. To the east of the canting space are three basins running east and west, parallel to each other and to the river, two of which to the south being 200 feet wide, and that to the north varying from 200 to 240 feet. They are separated by quays 250 feet wide. The extreme length of the water area is 2,000 feet and the width 1,100, and the space covered is 34⅔ acres, while the available quayage is 3,760 yards. The depth at low water, ordinary spring tide, is 25 feet and at high water 36 feet; but along the west wall there are berths with depths of 28 to 39 feet, so as to provide accommodation at the 120-ton crane for men-of-war and the largest vessels afloat. The total cost of this dock, including 100 acres of land, was about $8,000,000. Close to the entrance on the west are three graving docks, of which that next to the river (No. 1) is 560 feet long, 72 feet wide at entrance, and has a depth of 22 feet 10 inches on the sill at high water, ordinary spring tides. No. 2 is 575 feet long, 69 feet wide at entrance and same depth as No. 1. No. 3 is the largest in the kingdom of Great Britain and Ireland, and is 900 feet long, 85 feet wide at entrance and 26 feet of water on the sill at high water.

By far the greater portion of the harbor quays is built with solid stone work.

There are a number of cranes connected with the harbor, some of a powerful and elaborate description. The largest as well as one of the most powerful in the country is that erected at the Finniston quay in 1893, for the purpose of enabling the marine engineers of the district to place on board steamers the heavy boilers and other machinery required. It is a pillar crane, with framing, shafting and jib of mild steel, and gearing of cast steel. The holding-down bolts, which are 38¾ feet long, are 5 inches in diameter and weigh 8 tons, while the washer plates are each 6 feet square and weigh 13 tons. The frame,

which turns on a centre pin 17 inches in diameter and weighing 6 tons, is 27 feet high and weighs 50 tons; the jib, consisting of two tubes 3½ feet in diameter at the centre, is 90 feet long and weighs 45 tons; the total weight of the crane (exclusive of back balance box of 100 tons) is 270 tons, and the height above the quay 110 feet. The cost was $80,000, in round numbers. It has been tested up to 150 tons, but is meant to lift loads not exceeding 130 tons.

Within the limits of the harbor are ferries at York Street, Clyde Street, Stob-Cross and Kelvinhaugh. There are screw steam ferry boats of from 6 to 7½ horse-power, and carrying from 90 to 100 passengers. At Stob-Cross ferry is a unique elevating platform steamer, "Finniston." Her distinguishing feature is a deck which can be raised or lowered to the extent of 15 feet by means of six large and powerful steel screws, with bevel gearing, so that the upper movable deck is always kept at the same level as the quay, whatever be the state of tide. Built of steel, the vessel is 80 feet long, 44 feet wide and 12 feet deep, with a draft of 9½ feet when loaded, and has two propellers at each end, driven by triple expansion engines of 56 horse-power, and an independent engine for raising and lowering the deck. The movable deck is 78 feet long by 32 wide, and can carry 8 loaded carts and horses, with 300 passengers. Recently a tunnel has also been constructed under the river at Finniston, for foot passengers and vehicles.

In 1884 a number of passenger steamers, called Cluthas, from Clutha, the Celtic name of the Clyde, were built by the Clyde Trust and put upon the river, plying up and down the harbor from Victoria bridge to Whiteinch, a distance of 3½ miles. They are ten in number, of from 12 to 18 horse-power, and designed to carry from 200 to 300 passengers. They stop at alternate stations or quays on each side of the river, at about half a mile distance; one is calculated to leave each wharf each way once in five minutes, making a street of the river for passengers. The uniform fare is one penny.

Within the memory of people now living, the river Clyde was fordable within the present limits of the city of Glasgow. It has been made navigable for large steamers by the energy and progressive spirit of the citizens of Glasgow for a distance of 18 miles, at great labor and expense, and this has been done without national aid and without tax being levied upon the property holders of the city. In 1752 the town council of Glasgow opened the stock or capital account of what is now known as the Clyde Trust, or Clyde Navigation Trust, and the annual revenue of such trust has increased from $5,082.60 in 1771 to $1,721,831.83 in 1894–95, year ending June 30, 1895.

Up to 1858 the navigation of the Clyde continued to be managed by the corporation of Glasgow. Since then, by act of Parliament, the affairs of the Clyde navigation have been controlled and administered by a body of twenty-five gratuitous trustees, of which body the lord provost of Glasgow is chairman *ex officio*. These trustees consist of nine councillors elected by the town council from their body, nine gentlemen elected by the ship owners and rate payers of the port, two members elected by the Chamber of Commerce and two by the Merchants' House and two by the Trades' House of Glasgow. The nine persons elected by the ship owners and rate payers must be owners of vessels to the extent of 250 tons or payment of £10 sterling, about $50, of rates or upwards.

The port is not a commercial undertaking, in the sense of being conducted for profit like a private enterprise, but it is managed with the idea of keeping the dues and rates on vessels and merchandise at as reasonable a figure as possible, and yet to meet the interest on the borrowed capital and all other expenses and turn a reasonable profit each year into the sinking fund. Aside from the interest to be paid on the loans, the chief item of expenditure is the deepening and keeping navigable of the channel for eighteen miles of waterway.

The trustees have had to purchase and pay for all the land on which the docks and quays are built, and also for the land required in the work of making the river navigable, as well as all the works and equipment of the port.

While the corporation of Glasgow were the originators of the Clyde Trust, and controlled the navigation of the Clyde River until 1858, still, the trust was never at any time a part of the corporation property, in the sense that an assessment could be levied upon the citizens of Glasgow to maintain it. The navigation of the river by this trust has always been based upon its own credit solely; the large and increasing revenue and wise administration, together with the commercial prosperity and development of Glasgow and the west of Scotland, being the main elements of security.

Under various acts of Parliament since 1858, the Clyde Trust has been authorized to borrow $30,415,625. The total debt of the trust on June 30, 1895, was, in round numbers, $26,936,077.

It is very difficult to answer specifically the questions contained in the circular inquiry of the State Board on Docks and Terminal Facilities of the Commonwealth of Massachusetts, most of them calling for matters of opinion, which must be largely obtained by me from others, whose opinions and judgments have not always been alike.

Answer to Question No. 1:

The success of this port in competition with other ports is largely due to the wise management and energy of the officers of the Clyde Trust, and the growth and business of Glasgow. The physical features of the harbor are against it. It is twenty-one miles from the open water of the Firth of Clyde, and has at least eighteen miles of a narrow shifting channel of a river before its haven can be reached. I should say that the chief essential of its success is its management. The ownership of the docks, wharves and quays is entirely with the Clyde Trust, and this is undoubtedly a great benefit. The whole control is in this one public corporation, with no motive but the general public good, and its rates and dues can be and are uniform, and there is no clash or conflict between contending interests, as there would be in private ownership. This will answer the first six questions.

Answer to Question No. 7:

Private ownership and control of docks, etc., have not been interfered with by legislation, as none exist.

Answer to Question No. 8:

Public ownership of the docks, etc., gives cheaper rates and dues and better facilities in every way for the purposes of commerce.

Answer to Question No. 9:

The land was purchased from the former owners, and the funds were borrowed for this purpose.

Answer to Question No. 10:

The revenue from the docks and quays comes about one-third from the vessels and two-thirds from the cargoes. The cargoes pay the landing charges. The Clyde Trust is not at the expense of landing the goods. This is done by the ship owners, who employ their own men for that purpose.

Answer to Question No. 11:

There is direct railway connection with the docks and quays, but this connection has not been much used except in the matter of coal, ores, etc.

Answer to Question No. 12:

So much of the local railway connecting with main line, within the lands of the Clyde Trust, are owned by the trust; but the landed possessions of the trust are of but narrow width, as the harbor is built from a narrow river in the very heart of the city, and land has been acquired with difficulty.

Answer to Question No. 13:

The success of the harbor has not been dependent to any great extent upon its railway connections.

Answer to Question No. 17:

The chief staples of traffic at this port are coal, dry goods, iron and steel, Indian corn, provisions, wheat, wheat flour, timber and ores.

In making this report I have been much indebted to the officers of the Clyde Navigation Trust, who have furnished me with every facility.

U. S. Consulate, Glasgow, Oct. 17, 1895.

The following communications were also received: —

Clyde Navigation, Secretary's Office,
Glasgow, July 8, 1895.

Clinton White, Esq., *State Board on Docks and Terminal Facilities, Boston.*

Dear Sir: — I was duly favored with your letter of 12th ultimo and enclosures.

Instead of answering categorically the series of eighteen leading questions your Board have formulated, I think it will be more satisfactory and probably serve your purpose better if I give you some general information about this port, from which your Board will be able to draw their own conclusions.

The affairs of the Clyde navigation, embracing the port of Glasgow, are administered by a body of twenty-five gratuitous trustees, whose powers and duties are prescribed in their various acts of Parliament, chiefly the consolidation act, 1858, under which the present constitution was created.

The trustees are assisted by a staff of officials whom they appoint, viz., the treasurer, the engineer, the harbor master, the collector and the writer.

Prior to 1858 the navigation was managed mainly by the town council of Glasgow. The present representation, created in that year, consists of the lord provost of Glasgow, who is *ex officio* chairman of the Board, and nine councillors sent by the town council; nine gentlemen who are elected by and represent the ship owners and rate payers of the port; two members each elected by the Chamber of Commerce, the Merchants' House and the Trades' House of Glasgow.

From the last published accounts of the trust for the year ending June, 1894, your Board will gather information regarding the trade and revenue of the port, along with the indebtedness to the public.

There are no other docks, either public or private, at Glasgow.

The port is not a commercial undertaking, in the ordinary sense, conducted for profit, but is managed so as on the one hand to keep the dues and rates on vessels and merchandise at as reasonable a figure as possible, and on the other hand to meet the interest on the borrowed capital and all other outgoings, and leave a fair margin year by year. After the interest on borrowed money, the chief item of annual expenditure is that for the deepening and keeping navigable of the eighteen miles of waterway under the charge of the trustees.

The trustees have had to pay for all the land on which their docks and quays are formed and also for all land required for the widening and deepening of the river, and, of course, for all the works and equipment of the port.

Although the corporation of Glasgow were the originators of the Clyde Trust, and mainly controlled it until 1858, it was never at any time part of the corporation property in connection with which any assessment could be levied from the citizens in respect either of ownership or occupancy of property; and the navigation still remains based solely on its own credit, the large and increasing revenue and wise administration, together with the commercial prosperity and development of Glasgow and the west of Scotland, being the main elements of security. The trust contributes many thousands of pounds annually in assessment to the revenue of the city.

I forward a set of documents, consisting of copies of all the Clyde navigation acts, the last published annual accounts, the standing orders, the by-laws, the rates book, a map of the harbor and a map of the river Clyde, under the jurisdiction of my trustees.

For detailed information with regard to terminal and distributing facilities, I would refer you to description under "Glasgow," in the "Shipping World Year Book," which doubtless you will have before you in connection with your investigations.

The trustees do not load, unload or distribute cargo, the ship owners either providing their own quay staff and laborers or employing stevedores who are licensed by the trustees.

The railways have direct connection with the harbor, but do not perform any services except haulage, unless at the depot known as the general terminus, where there are cranes belonging to and wrought by the company in the loading of coal and discharge of ore and limestone.

The harbor is equipped with sheds, cranes, tramways, etc. No separate rates are levied for the sheds, but charges are made for cranage and wayleave over the tramways.

I need hardly say that I shall be glad to afford you any further information or assistance in my power, at any time during the course of your Board's inquiry.

I am very truly yours,

T. R. MACKENZIE.

CLYDE NAVIGATION, SECRETARY'S OFFICE,
GLASGOW, Jan. 16, 1896.

CLINTON WHITE, Esq., *State Board on Docks and Terminal Facilities, Boston.*

DEAR SIR: — I must apologize for not earlier replying to your letter of 16th ultimo.

I have had the statistics in the statement annexed to your letter checked and filled in, so far as our records enable us to complete the figures, and you will find annexed hereto a clean copy thereof.

DATE.	Population.	Length of Quays.	Area of Harbor.	Depth, H. W.	Ordinary Current Expenditure.	Revenue.	Total Goods Tonnage.
		Yards.	Acres.	Ft. In.			
1800, ...	77,385	382	4	8 6	-*	£3,400	-*
1820, ...	147,043	697	7	13 6	£7,516	8,070	-*
1840, ...	255,650	1,973	23	18	70,248	49,665	-*
1860, ...	395,503	4,376	70	22	86,256	105,768	1,366,327
1880, ...	578,156	8,422	140	23	222,430	223,709	2,653,088
1894, ...	677,883	10,853	153	26	349,354	371,976	5,070,392
1895, ...	686,000	12,178	190½	25–31	344,015	353,813	4,504,962

* These particulars cannot now be ascertained.

By the favor of the author I am enabled to forward a volume entitled "Statistics of Glasgow, 1885–91," by the city chamberlain,

from which you will glean a great deal of information regarding the industries and commerce of the city and port.

I shall be very glad to receive a copy of the report of your committee after it has been presented.

I am very truly yours,

T. R. MACKENZIE.

HAMBURG (Germany).

[From the report of W. H. ROBERTSON, U. S. Consul.]

Answer to Question No. 1:

To a combination of its geographical features, the advantages of its free port, and the ability and enterprise of its business people.

Answer to Question No. 2:

To a considerable extent. In the first place, the position of Hamburg with regard to the continent of Europe is favorable to its growth as the leading receiving and distributing centre of north-eastern Europe, especially in connection with the English, Scandinavian, Russian, German and Austrian trade, both inwards and outwards.

In the second place, Hamburg has a naturally good harbor, which has been materially deepened and improved in every direction since the opening of the new free port here in 1888. Not only has a practically new harbor been actually constructed in the direction of size and depth, but with the building of the same have arisen innumerable quays and warehouses, possessing all the most modern facilities for the loading, unloading and storage of merchandise of all sorts. Vessels have recently arrived in this harbor drawing as much as 26 feet 3 inches. There is a serious and constant drawback, however, to the commerce entering and leaving this port in the largest vessels, in the shape of a number of sand bars occurring between here and Cuxhaven, at the mouth of the Elbe. Beginning at Hamburg and going down the river, the first shallow spot is reached at Blankenese, a distance of about 14 miles from the city; the second, at Schulan, 7 miles further; the third, near the Luhe, about 3 to 4 miles further down; the fourth is the Pagen bar, about 42 miles from Hamburg; while the fifth, at Osteriff, is about 72 miles from the city. Larger vessels, drawing more than 18 to 20 feet, can only cross these spots with a rising tide, and, at the earliest, about two hours before high tide. The so-called "Schuelldampler," or fast mail steamers of

the Hamburg-American line, the "Furst Bismarck," "Normania" and "Augusta Victoria," can never risk coming up into the harbor when having their full complement of coal for a voyage. When fairly empty they experience no difficulty in reaching the city. The five new cargo steamers of the same line, the "Patria," "Persi," "Prussian," "Palatia" and "Phœnicia," when fully loaded, can barely cross these bars. Hence the fast steamers always discharge their passengers at Cuxhaven, and come only up the river to Brunshansen (some 22 miles below Hamburg), where they take in their coal for their outward trip, and then again drop down to Cuxhaven to receive their outward-bound passengers. In the same way, to avoid any risk of running aground, the large freight steamers nearly always complete their cargo below the worst of these sand bars. During the prevalence of an east wind there is an abnormal lack of water in the Elbe, and shipping is often seriously inconvenienced, or even entirely suspended, for the largest vessels during such a period. A new large steamer of the type of the above-mentioned five freight boats is at present being built for the Hamburg line. Although she will be one of the largest vessels afloat, and have a carrying capacity of about 12,000 tons dead weight, she will draw a trifle less water than the five steamers above mentioned. Another disadvantage to shipping is to be found in the large quantities of ice, which in severe winters often become a serious obstacle to shipping. For the purpose of relieving at least some of the vessels of the dangers, inconveniences and delays attending such conditions, it was decided to construct a new harbor at Cuxhaven. This harbor, which, like most of those at Hamburg, is cut out of the solid bank of the river, and is bordered on three sides by stone quays, will most likely be completed next autumn, and will be used principally by the largest steamers of the Hamburg-American line; in fact, the intention is to despatch the express steamers of this line from there altogether in the future. But besides, the new harbor will serve as a port of refuge for such vessels as are unable to pass up to Hamburg on account of the ice.

In the third place, the situation of Hamburg on the Elbe is a specially favorable one, for an immense trade with the interior of Germany and Austria is carried on up and down this river and its tributaries by means of a large fleet of barges and lighters; and Hamburg happens to lie exactly at the junction of the commerce of the upper with that of the lower Elbe. Here the river navigation by these small craft has to end on account of the size of the river, strength of the currents, rise and fall of the tide, etc., while here the sea navigation, so to speak, begins. The fact that Hamburg, instead of Cuxhaven, has become the chief sea-port of Germany,

is perhaps more largely traceable to these conditions than to any others.

, The advantages and inducements to trade held out by the customs exemptions and other benefits of the free port of this city can scarcely be numbered among the physical features entering into the success of the port, further than that, as already remarked, the construction of the new free port in 1888 gave rise to many artificial improvements in the harbor.

Answer to Question No. 3:

There are no docks and wharves here, such as those in ports like New York and Liverpool. Instead of these, there are only quays; and the success of these is affected favorably only so far as their good and practical management and control by the municipal authorities brings it about.

Answer to Question No. 4:

It is not thought that it affects it materially.

Answer to Question No. 5:

It is entirely public, with two exceptions, — the Pterson quay and the Petroleum harbor. The former is leased to the Hamburg-American line, and is managed and controlled by it, while the latter is rented by the representatives of the Standard Oil Company. All vessels bringing petroleum into the port of Hamburg must discharge their cargoes in the Petroleum harbor. It is very carefully guarded against danger from fire, and all vessels entering it are governed by stringent precautions and rules.

Answer to Question No. 6:

The use of the quays is regulated by the quay department, which is a special branch of the municipal government. Its direct chief is the quay director, who is subordinate to the senator at the head of the department for commerce and industry.

Answer to Question No. 7:

The quays have been built and always owned and controlled by the city, with the exceptions above noted.

Answer to Question No. 8:

Probably none, except that public ownership means lower expenses of administration and lower profits to the owners than private parties would be contented with.

Answer to Question No. 9:

There were no former owners. The government of the city or State of Hamburg has always owned the quays.

Answer to Question No. 10:

The principal part of the revenue of the quays comes from charges on the cargo, which also pays the landing charges.

Answer to Question No. 11:

Yes; with one or two unimportant exceptions.

Answer to Question No. 12:

Yes; and it is owned and controlled by the State of Hamburg. Its freight rates are based upon the weight of the goods.

Answer to Question No. 13:

None as compared with similar European ports, which have equally as good railroad connections.

Answer to Question No. 14:

Yes. All of the cargoes going by water into the interior are carried in barges and lighters, which serve the purposes of both transportation and lighterage. These barges or lighters help to materially reduce the amount of actual quay surface that would otherwise be indispensable to the commercial needs of the port. They are like so many little floating quays, that are moved up to and withdrawn from vessels at will. The cargoes that they bring down for export are put into the vessels directly from the barges or lighters without the use of the quays, while in most cases those which they are to carry up the Elbe are unloaded directly into these from the larger vessels. Hence the term "lighterage" at this port applies as well to the loading of vessels as to the unloading. Besides the lighterage done through the freight craft that ply regularly up and down the Elbe, there are many

other lighters used here for loading and unloading vessels, as well as for carrying cargoes to the various warehouses lying along the river and on the numerous canals intersecting the city and the free port. The whole harbor and free port have been constructed with a view to the use of these lighters, and the chief advantages of the same are their cheapness and carrying capacity, as compared with vehicles, the lightening of the street traffic, the saving of time and often of the reloading and re-unloading and the reduction of the quay space which would otherwise be necessary. Besides, distances from vessels to warehouses, and *vice versa*, are often shortened by going through the canals, as compared with the routes for vehicles. Practically all sailing vessels are loaded and unloaded by lighters, on account of the greater expense which the use of the quays would entail. These vessels lie alongside and are made fast to rows of what are called "dolphins." They are not anchored out in the harbor, as with us. Sometimes a vessel is obliged to use the quays and their cranes, when her cargo is such as cannot be discharged into, or loaded from, lighters, as in the case of heavy lumber, machinery, guns, etc. The lighters are also largely used for carrying cargo and coal to and from the larger vessels that cannot cross the sand bars with full freight, or even with their usual complement of coal, as in the case of the fast mail steamers of the Hamburg-American line.

Answer to Question No. 15:

None.

Answer to Question No. 16:

No; not accurately.

Answer to Question No. 17:

Sugar. Next in order of importance would probably come coffee, petroleum, nitrate and logwood.

Answer to Question No. 18:

None of special pertinence. On November 27, I forwarded to the department of State a lengthy and exhaustive report on the general subject of the free port of Hamburg, covering the period from the earliest beginning of its history to the present date. This report will most likely ere long be printed and published in the monthly consular reports, and will, I think be found to contain much in the line of the

foregoing inquiries, other than that which has been directly inquired about. It is therefore suggested that this report be read in connection with the other.

It may also be pertinent to mention, in conclusion, that during my absence last summer, two members of the Massachusetts State Board on Docks and Terminal Facilities, Messrs. J. R. Leeson and Woodward Emery, visited this city for the purpose of personally inspecting the arrangements of this port, on which occasion they were shown the entire harbor, with all its quays and terminal facilities, by my vice-consul. I feel sure, therefore, that these gentlemen will be in a position to elucidate verbally any points in this report which have, perhaps, not been discussed in detail.

U. S. CONSULATE, HAMBURG, Dec. 31, 1895.

HAVRE (France).

[From the report of C. W. CHANCELLOR, U. S. Consul.]

In compliance with the request contained in your circular letter of July 12, 1895, I have the honor to communicate the following report on the subject of the docks at this port, and to reply seriatim to the questions prepared by the Massachusetts State Board on Docks and Terminal Facilities.

Answer to Question No. 1:

To its location and accessibility; to its small port charges; to its direct communication by rail or water with the manufacturing and agricultural districts of France, England, Belgium and Holland, and its proximity to Paris; to its excellent harbor and docking facilities; to its numerous steamship and sailing vessels departing from and arriving at the port, and trading regularly with the principal ports of the world, notably those of France, England, Germany, Norway, Sweden, Denmark, Holland, Italy, Austria, Russia and America, the frequency being in the order named. Ships, after debarking their cargo, can remain at the port an unlimited time, awaiting freight, repair or final disposition, without paying any dock or harbor dues, the tonnage dues being paid on arrival in the docks. Below is the schedule of port charges.

The law of Jan. 30, 1892, fixes the quay charges for France

and Algeria, on ships coming from foreign countries or from the colonies and possessions of France, loaded or partly loaded, as follows: —

From European countries, or countries bordering on the Mediterranean, at ten cents per registered ton of the vessel. From the provinces of all countries, twenty cents per registered ton.

Vessels conveying passengers pay port dues only on the number of passengers, horses and carriages which they bring.

The law of July 29, 1889, provides that vessels carrying passengers be required to pay quay duties only on the number of passengers, horses and carriages on board, and on the quantity of merchandise which they carry, provided the gross weight of such merchandise, calculated on the basis of five hundred kilograms to the ton, does not represent one-tenth of their gross tonnage. If the merchandise on board exceeds one-tenth of the legal tonnage, quay charges will be made on both the quantity debarked and that remaining on board to be carried to another port. Charges on the ship itself are made according to the legal tonnage.

For French ships this tonnage is established in conformity with the process of gauging known as Moorsom's method; for foreign ships by the same method, unless otherwise provided by treaty.

This charge applies to both French and foreign ships. Ships of war, pleasure yachts and ships entering the port without debarking any part of the cargo are not subject to the charge.

The Chamber of Commerce of the city of Havre, with the approval of the minister of commerce, made, on the 31st of August, 1893, the following modification for the port of Havre: —

(1) Vessels beginning their voyage, or having their destination outside of Europe, pay eight cents per registered ton quay duties; (2) vessels beginning the voyage in France, and having their destination a European port, or a port in Africa or Asia or on the Mediterranean Sea, pay six cents per registered ton; (3) vessels fully loaded, or loaded to the extent of nine-tenths of their carrying capacity, with cereals (wheat, barley, oats, corn and rye), timber from the north of Europe, fertilizers, coal, iron ore, mineral oil and ice, pay eight cents per registered ton. A reduction of thirty per cent. on the established tariff is made for vessels belonging to a regular line of navigation having at least monthly departure from this port, and forty per cent. for vessels belonging to a regular line when the departure is weekly, thirty per cent. on vessels when they are not more than two-thirds loaded, fifty per cent. on vessels bound for Honfleur, *via* the canal. Vessels belonging to or employed by the government are free from port dues.

Answer to Question No. 2:

To the extent vouchsafed by a broad, accessible harbor, deep still water, exceptional facilities for landing and handling goods, extensive sheds, well-planned and secure docks and quays, with solid stone facing and coping, clean water in docks, excellent potable water, abundant provision market and a reasonably clean city.

Answer to Question No. 3:

To the extent that may be reasonably expected of liberal business-like dealing upon an established basis of exact justice to all and partiality to none. The management is under natural regime by government officials, the minister of public works being the supreme authority.

Answer to Question No. 4:

Answer as above, the ownership being by the government.

Answer to Question No. 5:

Answer as above.

Answer to Question No. 6:

Under the control of the chief engineer of the bridges and roads, appointed by the government.

Answer to Questions Nos. 7, 8 and 9:

Practically answered above. Owned by the government, under supervision of the municipal police.

Answer to Question No. 10:

No charges on cargo; port and dock dues paid by the ship until cargo is discharged; after this, no charge. (See rules and regulations under Question No. 2.)

Answer to Question No. 11:

There are railway connections with all docks. The tracks are also laid under the principal sheds, and cargoes can be received or unloaded directly from the ship into the cars, or *vice versa*. All railroads under government control.

Answer to Question No. 12:

Answer as above.

Answer to Question No. 13:

In the ratio of the convenience and economy of loading and unloading cargoes on the spot, and with only one handling.

Answer to Question No. 14:

No lighterage. All cargoes discharged on the quays and for the most part under sheds.

Answer to Question No. 15:

Deep water leading directly into the docks; safe moorage for all vessels; great facilities for handling goods; steam and electric cranes; floating pontoons with steam cranes; electric lights; protection against weather; direct and immediate connection with railway, canal and river Seine.

Answer to Question No. 16:

No answer.

Answer to Question No. 17:

Exports from France and imports from the principal countries of the world.

U. S. CONSULATE AT HAVRE, Aug. 8, 1895.

HULL (England).

[The report of GORDON B. DANIELS, U. S. Acting Consul.]

Before answering separately the interrogatories forwarded for my consideration and report, it may not be either uninteresting or uninstructive to describe very briefly the origin and character of the Hull dock system.

The first dock was built more than a century ago, by a company incorporated as the Hull Dock Company. The dock was constructed on the site of a portion of the old walls and fortifications of the

town, and the company was assisted by concessions made by the Crown and by the municipal corporation. In course of time this dock was followed by two others, following the course of the old fortified walls in a southerly direction to the Humber, with a fourth dock branching westward. Prior to the construction of these docks the shipping of the port had no other accommodation than the river Hull, or "Old Harbor," as it is popularly called, and which empties itself into the Humber. The whole of the old or historic town of Hull is insulated by these docks and the harbor, bridges affording means of communication between the old and newer portions of the borough. The town docks were followed by a dock eastward of the town, with an entrance from the Humber on the south and from the old harbor. For many years these docks served the commercial and trading requirements of the port, but, as the size and tonnage of vessels increased, it became necessary to provide deeper dock accommodation. The result was the construction by the dock company of an extensive dock on the western foreshore of the Humber, and this was followed by another, or what may be described as an "extension dock," in the same westerly direction. The docks in this direction — the upper portion of the Humber — have been supplemented by a very large fish dock for the accommodation of the fishing fleet; and at the present time the North-eastern Railway Company, now the owners of the docks alluded to, have in course of construction an extension fish dock, demanded by the requirements of the fishing industry.

Until 1880 the dock estate was entirely owned by the Hull Dock Company, and the North-eastern Railway Company had a monopoly of the carriage of goods to and from the port, save and except where the canals and waterways competed with them. The North-eastern Railway Company invested largely in dock shares, as did several other railway companies, and were represented by directors on the Dock Board.

The merchants and traders generally, as well as the ship owners, complained of the high rates of railway carriage and dock charges; and in 1879 a formidable movement was commenced for the formation of a new dock company, with an independent railway.

Notwithstanding very strong opposition in Parliament, the promoters succeeded in obtaining a bill authorizing the new company to construct the Hull & Barnsley line and the Alexandra dock, which is the largest and deepest dock in the town. The new dock is built on the eastern foreshore of the Humber, that is, nearer the sea, and not far from the eastern dock built by the old company. The immediate effect of the opening of the new (Alexandra) dock and the independent line was to divert business to a very considerable

extent from the old docks and from the North-eastern Railway. The dividend earning power of the dock company was reduced to *nil*, and, being utterly unable to raise money to enable needful improvements to be made in the facilities at the docks and to keep their estate in good condition, negotiations were entered into between them and the North-eastern Railway Company for the purchase of their undertaking. Eventually the transfer of the docks was agreed to, the North-eastern giving for every one hundred pounds' worth of shares in the dock estate stock representing thirty pounds. The transfer of the docks to the North-eastern was opposed by the Hull corporation, but mainly with the object of securing certain guarantees as to future improvements and facilities.

The bill, which was jointly promoted by the old dock company and the North-eastern Railway Company, was sanctioned by Parliament, and the railway company now own the whole of the docks, with the exception of the Alexandra dock; that is to say, the old town docks, comprising Queen's dock, Prince's dock, Railway dock and Humber dock (which, with the old harbor or river Hull and the river Humber, make the old town an island); the western docks, comprising Albert dock, William Wright dock, St. Andrew's (fish) dock, the extension (fish) dock and the Victoria dock (the eastern dock near to the Alexandra dock). I may here state that, in view of the necessity for deeper dock accommodation in so far as regards the North-eastern Railway's system, it is intended to apply to Parliament in the next session for authority to make a better entrance to the western docks, so as to accommodate vessels of larger draught. This improvement, the extent of which has not yet been revealed, will involve doubtless some physical alterations at the basinal foreshore on the west of the Humber, so as to get a greater depth of water at the entrance from the river.

I will now proceed to answer the interrogatories specifically: —

Answer to Question No. 1:

The commercial success of Hull is unquestionably due primarily to the magnificent geographical advantages which she possesses. She is also situated at a point on the banks of the Humber which, commercially speaking, places her in a happier position than her rival ports on the Humber, namely, Grimsby and Goole. The former port, although nearer the sea, being practically at the mouth of the Humber, is more exposed, and has to contend with a vast accumulation of mud which forms a sort of bar. As to Goole, she is far up the river, the upper reaches of which are dotted with

treacherous sands, which, despite the most careful navigation, cause many shipping casualties. Goole can only be reached at certain stages of the tide by moderately sized vessels, and at all times the most careful navigation is necessary for the safety of the ships. There are sands in the river facing Hull, but they are neither so numerous nor so dangerous, and the fairway is a broad and a good one. For trade with the near continental ports and the whole of northern Europe, Hull is more favorably situated than any other north-eastern port of England. These reasons, and probably these reasons mainly, up to the time of the destruction of the North-eastern Railway and the dock company monopolies, at the period stated above, contributed to the general and progressive prosperity of the port. Since the opening of the Hull & Barnsley Railway and the Alexandra dock there has been competition, and ship owners and the trading community alike have benefited.

Answer to Question No. 2:

What is known as the harbor at Hull is the river Hull, which is a tidal stream running from the Humber northward for some distance, and narrowing as it reaches the agricultural district, which it drains. At high tide it will float vessels of considerable burden all the distance to which the riparian mills and warehouses extend, but as a matter of fact it is used almost entirely by keels, lighters and barges. As I have stated in my introductory observations, the harbor was the sole place for shipping before the incorporation of the Hull Dock Company, now more than a century ago. The Hull River is not in the ordinary sense of the word a harbor, it is simply a river which empties into the Humber; and more than once a suggestion has been made that it should be utilized as a dock by diverting its course. The Humber really forms the harbor for Hull. The river is very broad opposite Hull all along the frontage of the two systems of docks, east and west, and the anchorage is good and safe in all weather.

Answer to Question No. 4:

This would appear to suggest the question whether public or private ownership of the dock estate is the more beneficial to trade. On this point there is considerable divergence of opinion in Hull. In the years 1864 and 1865 a very determined effort was made by some of the leading representative men to establish a public dock trust. This, be it remembered, was at the time when there was a monopoly of dock

and railway facilities. The proposal was at first taken up with much spirit by the townspeople and by the municipal corporation. The suggestion was that the trust should be composed of the corporation, certain elder brethren of the Trinity House and a certain proportion of the members of the different trading organizations. The opponents of the scheme, however, succeeded in defeating it by insisting that any deficit on the working of the dock estate, which, they argued, would be almost inevitable, would have to be met by a borough rate. Again, when the transfer of the old docks to the North-eastern Railway was proposed, in 1893, there was an agitation for the municipalization of the undertaking. The representatives of labor were particularly anxious that the North-eastern Railway Company should not possess the docks; but practically all the ship owners and merchants and tradesmen objected strongly to the municipalization proposal. They argued that docks as docks could no longer be made to pay; that they could only be made remunerative in the hands of railway companies, who would make their profit on the lines and docks combined. They point to the fact that the docks at Goole were owned by the Aire & Calder Navigation Company, and fostered by the Lancashire & Yorkshire Railway Company; whilst the docks at Grimsby were created and owned by the Manchester, Sheffield & Lincolnshire Railway Company, who provided dock facilities both for the general commerce of the port and for the fishing interest. The supporters of the municipalization of the docks were, under these circumstances, unsuccessful. It may be safely asserted that the majority of the different interests of the town are opposed to the public ownership of the docks, and from this fact it may be inferred that opinion in the main is favorable to the existing proprietorship.

Answer to Question No. 5:

In the case of the undertaking of the dock company recently transferred to the North-eastern Railway Company, the ownership and control are wholly in the hands of the North-eastern. There are, however, on the board what are called two local directors, but they are appointed by the company in the usual way, and they can do nothing for Hull unless their views meet with the support of their colleagues. With regard to the Hull & Barnsley Railway and dock (the Alexandra), which is the largest and newest, as stated before, the case is somewhat different.

When the promoters of the bill authorizing the construction of the new line and dock went to Parliament for statutory powers, they were supported by the municipal corporation, which took shares to

the extent of one hundred thousand pounds, and assisted them with foreshore land, stipulating only for a rent charge, and in other ways expressing in a substantial way their sympathy with and support of the movement. The corporation also protected the interests of the port, and secured the independence of the dock by the insertion of a clause giving them the right of pre-emption. They have also a representative on the board, and to this extent, and a by no means insignificant extent, as has been proved on many occasions when movements hostile to the commercial interests of Hull have been initiated by outside shareholders, the Hull & Barnsley Railway Company's dock and line may be said to be quasi-public. It may be added that there has never been any dividend earned, but the rate payers never complain of the help which has been rendered to the new company.

Answer to Question No. 6:

The whole of the docks and wharves — save those wharves which are not dock property — and the quays are regulated by the dock companies, who have by-laws for the purpose. The North-eastern have quite recently enclosed the Albert dock and the William Wright dock; but all the rest of the docks are open to the public, and have been since their construction. The enclosure has been justified by the extensive prevalence of pilfering on the dock quays and under the sheds. The North-eastern have suggested the enclosing of the town or old docks, but as yet no formal proposal has been made in this direction. A former attempt to enclose the old docks was resisted by the public.

Answer to Question No. 7:

Neither the State nor the municipal corporation has interfered with the ownership and control of the docks, save when the corporation has appeared in Parliament as an opponent to a bill, or, as in the case of the Hull & Barnsley Railway, when it supported a measure. This interference cannot, however, be said to have had much effect upon the policy or conduct of the proprietors, with the exception of the Hull & Barnsley, where undoubtedly, as far as trade and commerce are concerned, the town has benefited. At no time has there been any extraordinary legislative interference, and the corporation as such has no means of interfering; it can only suggest and recommend and defend the public rights and privileges against encroachments.

Answer to Question No. 8:

This question is practically covered by the answer to the fourth interrogatory. Hull has had no experience of the commercial benefits or otherwise, for the reasons already particularized. All that can be said on the matter is that opinion is not unanimous either for or against the principles of establishing a public trust or board. The balance of expert opinions is undeniably against the public ownership of the docks at Hull.

Answer to Question No. 9:

There is no public ownership, in the sense here indicated, as already answered, the public ownership, as represented by the Hull corporation's investment and measure of control, being comparatively limited.

Answer to Question No. 10:

The revenues receivable are about equally balanced between the dues paid by the vessels themselves and those paid by the cargoes which they bring. The cargoes always pay the cost of landing. The responsibility ceases when the cargo is put upon the ship's rail.

Answer to Question No. 11:

There are goods lines belonging to the North-eastern and the Hull & Barnsley direct to the docks, so that vessels discharging or loading are placed in immediate connection with the main lines. In the old town docks no locomotives run on the quays or property used and owned by the North-eastern Company, but there is a system of lines over which trucks are drawn by horses and taken to the branch or main lines. The facilities in this respect are quite adequate to the needs of the port.

Answer to Question No. 12:

There is no railroad, as distinct from the lines of the North-eastern and Hull & Barnsley, — the only two great companies really serving Hull. Other companies have running powers into Hull, but they run on independent or separate lines. The docks are connected with main lines in the manner just described.

Answer to Question No. 13:

Hull being essentially a port of transit, it is impossible to exaggerate the importance of its railway facilities in considering the contributing causes of its commercial prosperity. When the North-eastern enjoyed a monopoly of the traffic to and from Hull, it was the universal complaint that the rates of carriage were too high, and that, owning the Tyne and Hartlepool docks, these places were favored, to the detriment of Hull. The Hull & Barnsley line did and still does much to encourage the trade of the port, particularly in respect of coal. Vessels used to go to the northern ports to coal, but now they have facilities at Hull which were formerly denied them. Hence the chief Humber port is more and more reaping the advantages of her geographical position. There are still complaints that the North-eastern rates are excessive, especially having regard to the competition of the Manchester ship canal. The answer of the North-eastern to these complaints is that they are prevented from doing more for Hull by reason of their arrangements with other companies who exchange traffic with them.

Answer to Question No. 14:

In Hull there is no system of private lighter ownership, with the free use of all the docks. No charge is made for wharfage upon goods that are put overside into the lighters. This is kept as a check upon goods which are landed and go by rail, as the water traffic is found to be a very successful safeguard against any innovation or encroachment on the part of the railway companies in the direction of an increase of their quay charges.

Answer to Question No. 15:

The terminal and distributing facilities are some of the best in England, Hull having a free waterway in the shape of the river Humber, by which all descriptions of goods can be carried into the very heart of the country over the different waterways and canals. As the goods which are passed overside in the Hull docks into lighters and transported into the interior pay no wharfage or dock dues whatever, it will be seen at once that this fact is a very active agent in competing with and tending to check the advance of railway rates.

Answer to Question No. 16:

On this subject I have no knowledge which would justify me in submitting it as authoritative. This question will no doubt be answered fully by consuls at ports where public funds have been so used.

Answer to Question No. 17:

The two leading industries of Hull are the seed-crushing and oil trade and the timber trade, both of which are extensive. There are not many manufacturing industries, and for years the seed and timber trades have been looked upon as the staple trades of the town. There is a very important industry, namely, the deep-sea trawl fishing, with which it is calculated some twenty thousand persons are directly or indirectly concerned. This trade has, as stated already, a dock with an extension in progress, especially appropriated to its business, by the North-eastern Railway Company. The fishing interest represents something like one million sterling of invested capital.

Answer to Question No. 18:

The purchase of the docks (excluding the Alexandra, which, as already explained, belongs to the Hull & Barnsley Railway and Dock Corporation) has not up to the present period been so beneficial as had been anticipated to the traders of Hull. There are complaints that the town made a mistake in acquiescing in the purchase of the docks by the railway company, the allegation being that the directors have failed to develop facilities or to give reduced rates in order to increase traffic. The company promised to do this when they proposed to acquire the dock estate. No concessions are made to ship owners or others, either in respect of volume of traffic or shipping dues. There is, in fact, no differential rate, nor is any rebate allowed.

Under these circumstances, it is argued that there has been no material advantage whatever to the port from the amalgamation of the docks with the North-eastern Railway. It is further contended that, the North-eastern owning competing docks elsewhere, Hull is virtually locked up in the hands of a company which administers the property from a distance; that there ought to be local control, by men who are in thorough touch with the port, and know its requirements perfectly. These remarks do not apply to the Hull & Barnsley

Railway and Dock Company, inasmuch as to a great extent it is locally administered, and the corporation of Hull are large shareholders therein.

U. S. CONSULATE, HULL, Nov. 16, 1895.

Supplementary Report.

Since forwarding my report of the 16th instant, on the docks of Hull, the town has been very much excited by a formal notice on the part of the North-eastern Railway Company of their intention to apply to Parliament for powers enabling them to amalgamate the Hull & Barnsley Railway and dock with their own system. The new scheme involves the abandonment of the proposal, to which I referred in my report, for deepening the main foreshore docks of the North-eastern Company and the expected improvement of their estate in that direction. As I pointed out, the formation of the Hull & Barnsley Company was intended to destroy, as in fact it did, the monopoly of the Hull Dock Company and the North-eastern. The acquisition of the Hull & Barnsley undertaking would restore the status *quo ante*, or, in other words, the monopoly of the docks and railway communication, with this difference, — that the North-eastern would take the place of the Hull Dock Company, absorbed by them in 1893. The Hull municipal corporation has, to a certain extent, the power of vetoing the proposal of the North-eastern Railway Company; that is to say, they have a statutory right to assent or otherwise to any scheme for transferring the Hull & Barnsley line or dock to the North-eastern or any other company. But the Railway Commissioners, or the Board of Trade in London, may, if appealed to, decide whether the consent of the corporation is, or is not, "arbitrarily or unreasonably withheld." As far as the board of the Hull & Barnsley Company are concerned, it is certain that the majority approve of the proposed transfer, seeing that since 1880, when the company was incorporated by act of Parliament, no dividend has been earned. There can be no doubt that the scheme is unpopular in Hull, inasmuch as nothing is more dreaded than a restoration of dock and railway monopoly. Full details are yet wanting, and there seems to be very little obstacle in the way of the North-eastern becoming the purchasers of the Hull & Barnsley Railway and dock, save the opposition of the municipal corporation, — an opposition which is a foregone conclusion. The great majority of the shareholders would doubtless welcome the amalgamation, for the reason stated.

U. S. CONSULATE, HULL, Nov. 23, 1895.

The following communication was also received: —

HULL, Dec. 27, 1895.

DEAR SIR: — I have your esteemed letter of the 29th ult., and have taken very careful note of the contents. Owing to absence from Hull, your communication has not been so promptly replied to as I could have wished, and you must not construe this into any desire not to give you whatever information I can in as condensed and concisive form as possible.

With regard to the North-eastern Railway Company, I have sent you a book which is published, showing the position of affairs up to a certain date, and the way they used Hull until their monopoly was broken through in the year 1880, by an act of Parliament being got to construct the Hull & Barnsley Railway, with the Alexandra dock at the end of it.

It has been the North-eastern Railway Company's practice, even up to the present time, to carry goods from Hartlepool and Tyne docks in the north of England (where they own the docks) to Sheffield and Birmingham and other important centres in England at the same rate as from Hull, although the distance in some cases is sixty to seventy miles shorter from Hull, and thereby injuring the development of Hull; and there can be no question about it, had Hull not been tied down to one railway company, Hull would have been twice the size it is to-day as an importing centre.

Immediately after the Alexandra dock and railway were opened in 1885, the old docks, which were in the possession of a separate company, and which were controlled indirectly by the North-eastern Railway Company, although they had no interest in its losses and gains, — this old dock company, owning the old docks, was pushed forward by the railway company to fight the Hull & Barnsley Company and the Alexandra dock on dock rates, and a ruinous war on rates took place between the Alexandra Dock Company and the Hull old dock company, which ruined the latter, and their estate had then to be sold; and there was only one buyer, and that buyer was the North-eastern Railway Company, whose lines interlocked the whole of the docks; and the one hundred pound shares of the old dock company, which had been paying good dividends for years, were sold, giving the shareholders a little over forty pounds for their one hundred pound shares, — an enormous sacrifice.

The North-eastern Railway Company went to Parliament to get power to buy the old docks, and promised the traders of Hull all sorts of things with regard to improvements, and based upon this promise the traders supported them. They have had the docks now nearly

two years and a half, and practically nothing has been done to the Hull docks, and now they are going to Parliament to try and buy the Hull & Barnsley Railway and Dock Company at a wreck price, after the maiming they gave it in the opposition which they put forward through the old dock estate, and so once more have the monopoly at Hull. The Chamber of Commerce and corporation, and, in fact, the whole town, are against it, and the scheme ought to be strangled in its infancy, as it is very dangerous for a railway company to own the direct outlets of the country; as, if the North-eastern Railway get hold of Hull again, they would practically own every dock and harbor on the east coast of England, either directly or indirectly, over a distance of one hundred and sixty-five miles on the sea border of this country, and every trader or merchant would be in their hands as to whether he would be allowed to live in this country or not, which is a greater power than is wielded by Parliament itself.

There are no printed copies of the records; they are stowed away in the archives of the corporation and the lawyers here who have the business in hand; and one is in possession of myself, which I cannot very well part with, as there are many volumes, and they cannot be copied, and would cost a great deal to have them reprinted.

In my opinion, the monopoly of the North-eastern Railway Company in Hull, prior to the opening of the Hull & Barnsley Railway Company, had a most cramping and detrimental effect on the commerce of the port.

For your guidance I send you a copy of a newspaper and two or three of our Chamber of Commerce summaries, which will give you an idea of the business moving through this port; and trust what information I have given you may be of some service to you, and at all times at your command here,

I am, dear sir, yours truly,

W. A. Massey.

P. S. I may explain that the old Hull & Selby line was the original road into Hull on the present North-eastern route, and which they bought up to make their monopoly.

LEITH (Scotland).

[The report of ROBERT J. MACBRIDE, U. S. Consular Agent.]

The harbor of Leith, the sea-port of Edinburgh, consisted at first of the channel made by the water of Leith, as it flowed across the beach, called Leith Sands. The channel was tidal, and, though sufficiently deep at high water, depended entirely at ebb tide upon the small amount of fresh water that ran down it into the Firth of Forth.

Early in the seventeenth century a wooden pier resting on strong pillars was erected, and its character for stability is well illustrated by its lasting for over two hundred years. Between 1720 and 1730 there were constructed a stone pier, which was joined to the wooden pier so as to extend it by 300 feet, and a small dock on the west side of the mouth of the water of Leith. In 1777 a short pier, afterwards known as the Custom House quay, was built. The eastern wet dock was begun in the year 1800 and finished in 1806. The construction of the western wet dock was begun in 1810 and finished in 1817. In addition to the two wet docks, which together cost $847,000, there were also constructed during the same time three graving docks, at a cost of over $87,000, and drawbridges, at a cost of $55,000; there was also paid for ground in connection with these improvements the sum of over $387,000; so that the total cost of the construction and improvements made from the year 1800 to 1817 amounted to nearly $1,400,000. The measurements of the docks referred to are as follows: each of the wet docks is 750 feet long by 300 feet broad; each of the graving docks is 136 feet long by 45 feet wide at the bottom, and 150 feet long by 70 feet wide at the top. The entrances are 36 feet wide. A strong retaining wall, in the building of which over 250,000 cubic feet of ashlar was employed, protects the docks from the sea. The wet docks are still known by the name of the east and west old docks, although the western basin is also sometimes called the Queen's dock.

In 1826 further improvements were begun, resulting in the extension of the eastern pier about 1,500 feet, which gave it a total length of 2,550 feet; and also in making a western pier and breakwater, and in using part of the Queen's dock as a naval store yard. These improvements were completed at a cost of $1,161,000, borrowed from the government on the security of the dock dues. The Victoria dock was commenced in 1847 and completed and opened in 1851. This dock lies immediately to the north of the old docks, and has an area of nearly 5 acres. It is 700 feet long by 300 feet in

breadth, and has a wharfage 1,900 feet in length and 100 feet in breadth. It has an entrance which is 60 feet in breadth. The sum spent in constructing this dock, extending the piers and in deepening the channel amounted in all to about $650,000. In 1858 the Prince of Wales graving dock was opened; it is 370 feet long by 60 feet broad at its entrance. I have been unable to ascertain the cost. In 1869 the Albert dock was opened. It lies north-easterly from the Victoria dock. Its area is nearly 11 acres. It is approached from the west through an outer basin of more than 2 acres in extent, and by means of a lock 350 feet long and 60 feet broad. Hydraulic cranes are fitted on its quays, and, like all the other docks, it is well supplied with water hydrants and is lighted by gas. The total cost of the dock, including $175,000 for cranes, sheds, etc., was about $1,100,000. The construction of the Edinburgh dock was commenced in 1874 and the dock was finally opened by the Duke of Edinburgh in the year 1881. It lies immediately east of the Albert dock, to which it is joined by a channel 270 feet in length and 65 feet in breadth. A swing bridge worked by hydraulic power, costing $75,000, has been made over this channel, allowing easy communication with the north side of the dock. The dock covers an area of nearly 17 acres in extent, and cost, with the improvements in connection with it, the sum of more than $2,000,000. It is about 1,500 feet long by 650 feet in width, with a pier or jetty 1,000 feet in length, extending through the centre from east to west, giving in all some 6,000 feet of quayage.

The trade of this port having steadily improved since the opening of the Edinburgh dock, the Harbor and Dock Commissioners obtained powers by act of Parliament to construct further docks and other works. Under these powers an enclosure of about 85 acres of ground by a reclamation wall 4,400 feet long is in process of construction, and will be completed in about a year. When this is accomplished a dock 1,100 feet long and 500 feet wide will be commenced on the enclosed ground. The dock will be entered from the harbor by a lock 350 feet long and 70 feet wide, with a depth of water on the sill of 31 feet at spring tide and 26 feet at neap tide. There will be a passage 60 feet wide, with lock gates between the new dock and the north-west corner of the Albert dock, by which it is expected the Albert and Edinburgh docks will obtain some of the advantages of the increased depth of the new dock. The present quays are about 200 feet wide, but experience has shown that, with the large steamers arriving at this port, this width is insufficient, so the quays on the new dock will be 400 feet in width.

I am informed by the secretary of the Leith Harbor and Dock Commission that the new dock will be completed and ready for use in from four to five years.

The ownership of the docks, wharves and quays has always been vested in the public. Previous to 1838 the right of property over the harbor of Leith belonged to the city of Edinburgh. By an act of Parliament, passed in the year 1838, the petty customs of the town were transferred from the city of Edinburgh to the town council of the city of Leith.

The entire management and control of the docks is now vested in a commission of fifteen members. Three of these are elected by the town council of the city of Edinburgh, three by the town council of the city of Leith, one by the Edinburgh Chamber of Commerce, one by the Leith Chamber of Commerce, one by the Edinburgh Merchant Company, two by the ship owners and four by the rate payers, — those who pay $17.50 and upwards of dock rates. The members of the commission are men of the highest standing in the community, and they receive no compensation for their services.

The success of the harbor is due to the fact that the ownership is public, and also to careful and prudent management. Money is easily borrowed (when authorized by Parliament) at a very low rate of interest on the security of the dock dues. The fact of the port being at the capital of Scotland and being a transit port for other parts of Great Britain is also to be considered. The principal part of the revenue comes from cargoes. The total amount of revenue received for the fiscal year ending May 15, 1894, was somewhat more than $450,000. Of this sum, about $140,000 was from tonnage rates on vessels. The total amount received from cargoes, imports and exports was about $220,000. The graving docks, crane rates, shed rates and ballast produced a revenue of over $55,000, and the railway companies paid for the use of tracks on the quays the sum of over $12,000. There was also received from rents and other sources about $48,000.

Two railway companies, the North British and Caledonian, have their tracks over all the wharves and quays, and vessels can discharge and receive freight direct from the trains. The commissioners attribute much of the success of the port to the railroad connections.

There is no system of lighterage. If necessary, shippers find their own lighters.

The chief staples of the traffic in imports are grain, flour timber, sugar, etc.; in exports, coal, pig iron, beer, etc.

U. S. Consulate, Leith, Aug. 16, 1895.

LIVERPOOL (England).

[From the report of JAMES E. NEAL, U. S. Consul.]

Appended to the following report of the consul at Liverpool will be found a statement of facts and information taken from reports referred to: —

Answer to Question No. 1:

First-class dock, shed and warehouse accommodation. Superior facilities for the rapid discharge and loading of ships and manipulation of cargoes on the quays. Reasonable dues on ships and goods, etc.

Answer to Question No. 2:

See enclosed pamphlet No. 1, issued on the occasion of the opening of the new Riverside Station, and enclosed tabular statement No. 2, showing the water area, quay space, etc., of each of the Liverpool and Birkenhead docks.

Answer to Questions Nos. 3 and 4:

It is quite safe to say that the commercial progress of the port has been remarkably successful during the time it has been controlled by he present body.

Answer to Question No. 5:

See enclosed memorandum No. 3 as to the constitution of the Board, etc.

Answer to Question No. 6:

See answer to previous question, and also enclosed copy of the Board's general by-laws and regulations, and of the by-laws and regulations of the docks, quays, etc. (Nos. 4 and 5).

Answer to Question No. 7:

Some of the docks controlled by the Mersey Board are situated at Birkenhead, and were originally owned by a body called the Birkenhead Dock Company. In about the year 1855 or 1856 this body was unable to profitably work the docks in question, and the concern

was then sold to the corporation of Liverpool. It was subsequently transferred, under the provisions of the Mersey docks and harbor act, 1857, to the present Mersey Docks and Harbor Board. This is the only instance of private ownership in connection with the docks of this Board, and the fact of this transference for the reasons stated is a proof that private ownership, in this particular instance at all events, was not a success.

Answer to Question No. 8:

The commercial advantages of public control should be that the docks and harbor should be worked entirely for the benefit of the traders and those using and frequenting the port, and that all surplus revenue after payment of interest on borrowed capital should either go towards reducing the debt or capital of the company or should be expended in extensions of the docks system, or in providing new and improving the existing facilities at the port. Great care should, however, be taken to see that the members elected to serve on such a trust are altogether free from political bias, and that politics in any form should have no participation in the election of the members, and should be rigidly excluded from all questions affecting the trust. In the case of trusts such as that of the Mersey Docks and Harbor Board, the functions of the Board are administered without the members of the Board receiving any remuneration whatever, or enjoying any privileges for the time and attention bestowed by them upon the work.

As regards privately owned docks, the first consideration might be not so much the maintenance of the undertaking in a proper working condition as the provision of a dividend for the shareholders. The governing body would also without doubt require remuneration or privileges of some sort.

Answer to Question No. 9:

See enclosed copies of the Mersey docks and harbor act, 1857, and the Mersey dock acts consolidation act, 1858 (No. 7), which give the information required as regards the Board.

Answer to Question No. 10:

See page 25 of the enclosed copy of the Board's accounts for the year ending July 1, 1895 (No. 8). Goods landed at the Board's open docks are liable to the charges shown in the enclosed copy of the last published schedule of master porter's rates, etc. (enclosure No. 9).

Goods landed at the Board's enclosed docks (warehouse) are liable to the rates and charges shown in the accompanying schedule of warehouse rates, charges and rents (enclosure No. 10). Goods imported into and exported from this port are liable to the dock rates and town dues shown in the last printed tables of rates and dues on ships and goods sent herewith (No. 11). Landing charges, viz., the expense of discharging vessels, is usually borne by the ship owners.

Answer to uestion No. 11:

The principal railway companies, such as the London & Northwestern, the Great Western, the Lancashire & Yorkshire, and the Manchester, Sheffield & Lincolnshire, having termini in this city, have connections with the docks at Liverpool or Birkenhead at various points along the dock estate, and goods are discharged from and loaded into wagons to and from shipping in the docks adjacent thereto.

Answer to Question No. 12:

No. The railways are controlled by the companies named in answer to Question No. 11.

Answer to Question No. 13:

It is very difficult to answer this question, as so many factors enter into this case.

Answer to Question No. 14:

Goods are lightered from and to this port to and from the upper reaches of the river Mersey and the various systems of canals, including the Manchester ship canal, which exist in the north of England. Lighterage of goods is also carried on to some extent across the river, to and from the docks at Liverpool and Birkenhead. The charges, over which the Dock Board have no jurisdiction, vary widely, according to the service performed.

Answer to Question No. 15:

The distributing facilities possessed by this port, both sea and land, are unique, occupying, as it does, a natural central position in an extensive district teeming with an industrial population. The systems of warehouses owned by the Board for the storage of all kinds of

merchandise, and the specially constructed warehouses at the Waterloo dock and Birkenhead, fitted with appliances for the raising, storing, ventilating, etc., of grain, together with privately owned warehouses in the city, tend to make the terminal facilities of Liverpool second to none.

Answer to Question No. 16:

No; I have not such knowledge.

Answer to Question No. 17:

Grain and breadstuffs, cotton, sugar, fruit, provisions, timber, cattle, etc.

I deem it but right to say, before closing this report, that the foregoing answers to the questions submitted were made by the Mersey Docks and Harbor Board, and the language is theirs, and I reproduce it here as probably the best answers that can be obtained to the questions.

I also desire to herein express my appreciation of the kindness of the Dock Board in furnishing these answers and the memoranda accompanying the report.

U. S. CONSULATE, LIVERPOOL, Sept. 12, 1895.

Liverpool Docks Board Formation.

Prior to 1857 the docks and the works in connection therewith were under the control of the dock committee, whose proceedings, however, were subject to the approval of the Liverpool town council in meeting assembled, as trustees of the Liverpool docks; but by the Mersey docks and harbor act, 1857, the control and management of the docks at Liverpool and Birkenhead became vested in the present Board.

The twenty-fourth section of the Mersey docks acts consolidation act, 1858, provides that the Board shall consist of twenty-eight members, of whom twenty-four are to be elected by the dock rate payers.

By section eleven of the Mersey docks and harbor act, 1857, a person to be qualified to be an elective member of the Board must reside within the borough or the customs port of Liverpool, or within ten miles of the outward boundary of the said borough or port; and, according to the twenty-sixth section of the consolidation act, 1858, he must pay to the Board, within the year immediately preceding his

election, rates in respect of ships or goods to an amount of not less than twenty-five pounds. The other four members are appointed by the Conservancy Commissioners of the river Mersey, viz., the first lord of the Admiralty, the president of the Board of Trade and the chancellor of the Duchy of Lancaster. The members receive no remuneration. Each member is elected for a term of four years, but at the expiration of that period is eligible for re-election.

The qualification of an elector is the payment of rates to the Board in respect of ships or goods to an amount of not less than ten pounds, in the year preceding the 1st of August. He must also be a British subject, or a foreigner resident of the United Kingdom, and must be on the register of dock electors.

The business of the Board is conducted by committees, who meet weekly and whose proceedings are submitted weekly to the Board for confirmation.

Information in Connection with the Port of Liverpool.

The Mersey is tidal from its mouth at Liverpool to the town of Warrington, some twenty-nine miles up stream. At Liverpool, and for some distance above it, the estuary is wide and deep, affording a navigable channel and an anchorage ground where numerous vessels of the very largest class can safely lie at all times. The Mersey, abreast of Liverpool, is about 1,200 yards wide at its narrowest part, and at the lowest low water there is a depth of water of from 50 to 70 feet. From Liverpool out to the open sea in Liverpool Bay there are broad and deep channels, well buoyed and lighted, affording safe accommodation at all times for vessels between Liverpool and the sea.

Until a year or two ago the bar of the main ship channel formed an obstacle to the navigation of large vessels at certain states of the tide. In the year 1890 an experiment in dredging was determined on, and two steam hopper barges fitted with centrifugal pumps for raising sand and water were set to work on the bar. The results of the experiment were so far encouraging that the Board decided on proceeding with the work on a more extended scale. Their engineer recommended the construction of a sand dredger of very great capacity, and eventually a hopper barge was built, 320 feet long by 47 feet beam, capable of containing 3,000 tons of sand in her hoppers, and provided with pumps which enabled her to raise that quantity from the bed of the river in forty-five minutes.

The effect of such a dredger was soon felt, and the channel across the bar has, by the work of the dredger and the two smaller vessels,

been deepened for a very great width, so that vessels can now enter practically at all states of the tide, the channel being 1,450 feet wide, and having a depth of 24 feet at the lowest water of spring tides.

Some idea of the amount of material removed from the bar may be obtained when it is remembered that the quantity, if placed square up from the ground on a ten-acre field, would rise over 420 feet into the air; or, if placed in pyramidal form on the same area, would reach three times that height, say 300 feet higher than the Eiffel tower, or two and three-fourths times the height of the great pyramid at Ghizeh.

The deepening of the bar channel greatly improved matters at this end for the transatlantic passage. Detention at the bar became a thing of the past, and the liners could proceed direct to the river at Liverpool, there to land the passengers by tenders, which disembarked them without undue inconvenience at the great landing stage.

The part of the great landing stage known as the Prince's stage, constructed in 1857, has for many years been the chief point of landing and embarking transatlantic passengers, and here the custom offices and room for examination of passengers' luggage have been established.

The new scheme for the accommodation of the Atlantic passengers secured the retention of the existing stage, with all its necessary offices, etc., as the landing place, and included the bringing of the railway trains close alongside, a large and commodious railway station being constructed for the purpose. The stage is a floating structure 2,063 feet long and of a width varying from 80 to 100 feet. The flotation is given by a large number of pontoons (160) of wrought iron, on which are laid longitudinally a number of hollow girders or kelsons, upon which again is laid the framework of the deck, — wrought-iron beams covered by planking of green-heart, a hard and durable West India timber. This stage, of course, rises and falls with the tide, and maintains its deck at a uniform level above the water. Connection with the shore is maintained at all states of the tide by means of bridges hinged at the shore end and also at the stage end, the gradients of which vary with the state of the tide, and are always practicable for foot passengers.

The operations in connection with the berthing of the vessels and the transfer of passengers and luggage have in every case been successfully and expeditiously carried out, passengers having been on their way to London in less than an hour from the time of the vessel mooring alongside the stage.

River and sea channels: —

Depth of water at bar at low water of spring tides at present (feet),	24
Depth of water in river opposite Liverpool at same state of tide (feet),	50–70
Width opposite the landing stage (yards),	1,200
Length of river frontage of the Liverpool dock estate (miles),	7¼
Area of water space of the Liverpool and Birkenhead docks (acres),	546
Length of quays, Liverpool and Birkenhead docks (miles),	35

Great landing stage, Liverpool: —

Length (feet),	2,063
Breadth (feet),	80–110
Area (square yards),	20,000

Riverside station: —

Length (feet),	790
Breadth (feet), about	85
Height from rails to apex of roof (feet),	50
Length of platforms (feet),	740
Width (feet),	20

MERSEY DOCKS AND HARBOR BOARD,
GENERAL MANAGER AND SECRETARY'S OFFICE,
LIVERPOOL, Oct. 22, 1895.

MY DEAR SIR: — Referring to your letter of the 4th instant, making certain inquiries as to the amount expended by this Board in connection with the dock estate, I beg to reply thereto as follows: —

Q. 1. How much has the Mersey Docks and Harbor Board spent, in gross, in acquiring their present property?

A. 1. I am not in a position to furnish you with actual figures to show the amount which has been spent in gross in the acquisition of the Board's present property, but in round numbers it may be taken that it approximates £40,000,000.

Q. 2. What is the present amount of bonds outstanding?

A. 2. The amount of bonds and annuities at present outstanding is £17,782,356 5*s.* (see page 2 of the Board's accounts for the year ending the 1st of July last, sent per book post).

Q. 3. Has the reduction been made out of the surplus earnings of the Board, after deducting running expenses?

A. 3. Very large sums of money have been expended on the dock estate, in excess of the amount of the bond debt, out of the revenue of the estate.

I am yours very faithfully,

MILES KIRK BURTON.

The Hon. WOODWARD EMERY, *Chairman,*
State Board on Docks and Terminal Facilities, Boston, U. S. A.

MARSEILLES (France).

[The report of CHARLES P. PRESSLY, U. S. Vice-Consul.]

Answer to Question No. 1:

The geographical position of Marseilles is one of the most important elements in its success as a port. It is the natural gateway between western Europe and the countries of the Levant, and a large percentage of the trade of China, Japan, India, Turkey and Africa is discharged upon its wharves. It is the chief objective point, and by the force of natural circumstances the currents of trade from the far east find an outlet through this port. From the time of the Phœnecians, Marseilles has been the commercial centre in which was focalized a large share of the Mediterranean trade. Following its geographical position and advantages, lines of ships were established and operated between this port and all the important commercial points upon every sea. Hence, by reason of superior connections, the volume of trade has gradually increased since 1819, until the total port receipts in 1889 amounted to 4,657,906 tons, making Marseilles the eighth sea-port of the world.

The entrance to the harbor is easy and feasible at all hours and times, without reference to tides. (There is no tide in the Mediterranean.) No bars or other such obstructions to free navigation exist, but the harbor entrances enjoy a water depth of 30 to 45 feet; while in the docks themselves and to the very side of the quays vessels drawing 30 feet of water may be moored. Deep water, therefore, is one of the pre-eminent facts, to which is due the superior advantages of this port. As an accessory circumstance, there is a breakwater constructed of stone and protected towards the sea by immense concrete blocks. This breakwater is 3,595 meters long, and is regarded as one of the most substantial and magnificent in the world. Thus the free circulation of deep water is supplemented and protected by a solid wall.

As an area for the manœuvring of vessels and handling of merchandise, there are more than 340 acres of water surface and 49,475 feet of quays, more than one-half of which is practically free. Five dry docks, covering about 20 acres, afford ample conveniences and facilities for repairs. The equipment of the private docks is quite complete; there are extensive warehouses for storage, cranes, lighters and floating elevators for the handling of merchandise, with special facilities for loading and discharging wheat. We regret the lack of special knowledge and expert training which would enable us to give a minute description of harbor facilities.

Answer to Question No. 2:

Marseilles is built on a line of hills, which describe a semi-circle as they slope to the port. When the new docks were constructed it was necessary to fill in a large area, so abrupt was the passage from the shore line to deep water. On the north-west these hills from a natural protection to shipping against the mistral, — the prevailing and most severe wind. Then, as a counterpart to these physical features, the long and massive breakwater (over two miles in length) has been constructed to the south-east and parallel to the shore. Thus the harbor is protected from the sea by the breakwater and from the prevailing winds by the line of hills. The piers end a certain distance from the breakwater, so as to preserve for the entire length of the port a wide channel for the free ingress and egress of shipping.

Answer to Questions Nos. 3, 4, 5, 8 and 9:

From 1815 to 1890 the outlay, public and private, for the establishment of this port has been, in round numbers: by the State and the Chamber of Commerce of Marseilles, $15,800,000; by the private company of the docks and *entrepots*, $3,180,000. For the equipment of the port during the same period: by the Marseilles Chamber of Commerce, $1,200,000; by the private company of the docks and *entrepots*, $3,600,000, — making a total in seventy-five years of $23,780,000, of which $6,780,000 were expended by private enterprise and $17,000,000 by the public authorities. Since 1856 the private company has constructed and now owns and operates the three large docks, known as the Bassin de Joliette, Bassin Lazaret et Arenc and the Bassin de la Gare Maritime. These three docks cover about 145 acres of water surface, and are surrounded by 26,360 feet of quays, with numerous large stone warehouses. The public docks embrace the Vieux Port, the Bassin National and the Bassin de Raduah, with 195 acres of water surface and 23,115 feet of wharves, with sheds for temporary storage. The best equipment is owned by the private company, while the most extensive docks are the property of the public. This dual ownership and control has doubtless operated beneficially upon the character of the service employed and upon the interests involved. Men of special experience and information are selected for the responsible positions, and promotions, as a rule, are in both cases made from the ranks, thus securing careful, industrious and reliable services. As an investment, the shares of the private company have proven fairly remu-

nerative. The stock is now quoted at $85, and the dividends declared have varied from 4 to 5¼ per cent. The present market price, however, is below the normal real value, owing to short wheat receipts this year and other adverse circumstances existing for the moment.

The competition between the public and private companies has been an advantage to the commerce of the port. The company of the docks and *entrepots* has been held in check as to charges, and has been stimulated to meet the demands of trade. Improvements in every department have been made from time to time and facilities have been extended and increased. The public wharves have practically no warehouses, only sheds for the temporary storage of goods. Hence the private company of the docks and *entrepots*, by reason of more convenient location and of superior facilities, has retained a large share of the port business, and during the winter season its wharves are crowded to their utmost capacity. There is no participation or financial connection between the two companies. The public docks were undertaken, completed and are now controlled by the Marseilles Chamber of Commerce, and the nominal tax of one and a fifth cents per registered ton upon each vessel entering the port is imposed for the purpose of returning the public loans expended upon harbor improvements.

As to the relative advantages of private and public ownership, we cannot better answer the question than by quoting the words of Mr. Ad. Guerard, chief engineer of the port of Marseilles, in a paper read before the International Congress of Maritime Works at London in 1893. He uses the following language: —

> The history of the port of Marseilles shows how onerous private ownership may prove for the interests of commerce, and how hampering to the organization of good management; in short, how much it may injure the prosperity of a port.
>
> But the equipment of a private port is incomparably more easy than that of one open to public use. In the case of private ownership, the equipment may be absolutely complete and the most perfect; in the other case, of public ownership, on the contrary, the equipment is always limited to that which is most generally employed. In a private company the organization of the equipment is only one of the elements of the general organization of an enterprise, consisting of many and varied operations; the expense of material only represents generally a small part of the operating expenses. With a traffic even moderate, an enterprise of this character is susceptible of furnishing results industrially satisfactory. If, on the other hand, the equipment is only established with the view of being let to the public, it requires generally a traffic very considerable to render the operation profitable.

Answer to Question No. 6:

The public docks are under the immediate control and regulation of the Marseilles Chamber of Commerce, with the supervision of the national government. By law the Chamber of Commerce is specially charged with the direction and management of the port.

The private company of the docks and *entrepots* elects its board of control at a meeting of the stockholders, and this board is composed of men having the greatest financial interest in the company. In other words, is selected from among the largest shareholders.

Answer to Question No. 7:

In 1872, when the business of this port was practically in the hands and under the control of the private company of the docks and *entrepots*, the commerce had reached such proportions that the docks and wharves were altogether insufficient for the requirements of trade, and reclamations for delay and damage became numerous and frequent and were generally unheeded. The private company, intrenched in its monopoly, continued to impose its full tariffs and refused any enlargement of its facilities. To relieve this congested and paralyzing condition, new docks were authorized by national legislation in 1874, were begun in 1875 and completed in part in 1881. Public sentiment demanded in strong and vigorous tones the construction of the new docks, and that they should be owned and controlled by the public authorities, as a security and protection for all time against the monopoly and exactions of private companies. Free labor and free quays was the battle-cry of the agitation. Litigation arose; the private company of the docks and *entrepots* claimed an exclusive concession from the State. The courts decided against the contention of the private company, and the new national docks were undertaken, completed and are now controlled by the Marseilles Chamber of Commerce. The competition between the public and private companies has been most beneficial. It has stimulated improvements and multiplied facilities, while the port charges have decreased more than eight per cent. in five years.

Answer to Question No. 9:

There has been no change in the ownership of the docks, nor has there been any transfer from a private to a public company.

Answer to Question No. 10:

From 1875 to 1894 the national dock charged a fee of two cents per registered ton on all vessels entering the port. Since 1894 this charge has been one and one-fifth cents per registered ton. This was a tax on the vessel. The landing charges of the private company are twenty-eight and one-half cents per ton, which is imposed upon the cargo and is generally paid by the shipping company, though it is a matter of contract between the ship and the shipper. Hence the greater part of the dock dues is derived from the cargo.

Answer to Questions Nos. 11 and 12:

The tracks on the wharves of the private company are owned and controlled by the company, while the tracks of the lines serving the public docks and connecting the port with main line are owned by the public, but operated by the Paris, Lyons & Mediterranean Railway Company, the only railroad touching Marseilles. The total length of tracks on the quays is about twenty-seven miles, and it is about two miles from the port to the central railway depot. The freight charges are five cents a ton.

Answer to Question No. 13:

The proportion of success attributable to railway connections is problematical, and greatly limited by the fact that only a small percentage of the merchandise entered or shipped at this port passes over the connecting lines. In 1889, of the total port receipts, amounting to 4,657,906 tons, only 994,000 tons were transported over the branch railway. These figures show what an enormous proportion of the receipts are shipped out by sea or are carted and warehoused in the city. Perhaps there is no port in the world where more drayage is done, and the streets diverging from the docks are usually so crowded with carts and wagons that one is reminded of a past age, when animals were the sole transporting power on land. However, the conveniences and advantages of connecting railway lines are immense factors in the success of this port. In 1889, of the 247,453 tons of merchandise received by rail and shipped out by sea, 146,080 tons passed over the branch railway.

Answer to Question No. 14

There is a system of lighterage, owned and operated by private enterprise, but its advantages as a facility of the port are quite

limited, owing to the existence of deep water in the harbor entrances and in the docks. The charges are thirty-eight cents a ton.

Answer to Question No. 16:

I have not.

Answer to Question No. 17:

Cereals, principally wheat. In 1889, of the total port receipts by sea, amounting to 2,794,755 tons, 788,967 tons were grain.

U. S. CONSULATE, MARSEILLES, November, 1895.

MELBOURNE (Victoria, Australia).

[The report of DANIEL W. MARATTA, U. S. Consul-General.]

The questions propounded by the State Board on Docks and Terminal Facilities of Massachusetts are answered as fully as circumstances would permit as follows: —

Answer to Question No. 1:

As a port in competition with other Australian ports there has been no marked success in Melbourne. It was necessary, however, in the interests of shipping, the mercantile community and the public, to provide docks and terminal facilities to accommodate the largest class of ocean-going vessels, and in this respect this port is not behind any of the Australian ports.

Answer to Question No. 2:

There are no special physical features which enter into the success of this port, beyond its central position as a distributing one.

Answer to Question No. 3:

The history of Melbourne as a port shows that dock accommodation and terminal facilities cannot be made a success except under the best possible management, and with charges which are not in excess of a rival port, such as Sydney.

Answer to Question No. 4:

The custom authorities at this port are of the opinion that the establishment of docks, wharves and terminal facilities cannot be satisfactorily accomplished by private enterprise, nor can the interests of the public be thereby fairly considered.

Answer to Question No. 5:

The government and harbor trust own the whole of the wharves and terminal facilities in Melbourne, including one dry dock capable of accommodating vessels 500 feet long and 27 feet deep; and in addition thereto there are three private docks for painting and repairing vessels, on leasehold property, vested in the Melbourne Harbor Trust, which are worked independently of the government and of each other, and are liable to municipal rates.

Answer to Question No. 6:

The Melbourne Harbor Trust was established by Parliament in the year 1877, a corporation for the regulation, management and improvement of the port of Melbourne; and for these purposes it was endowed with a revenue, nine-tenths of which is derived from wharfage rates on imported goods. The harbor trust is composed of seventeen members, and has the power to take, purchase, sell, lease and hold lands and other property, subject to certain restrictions.

Answer to Question No. 7:

See answers to questions Nos. 5 and 6.

Answer to Question No. 8:

The commercial advantages of public over private ownership are, that with public ownership steps can be taken to meet the requirements of any port proposed to be established in a more complete manner than could be effected by private proprietors, inasmuch as such State owner can become legally possessed of public lands free of cost, and therefore can erect more commodious and permanent works at a more economical rate than private owners, and consequently are in a position to supply the necessary accommodation for shipping at a more reasonable charge.

Answer to Question No. 9:

With the exception of the dry docks, which are leasehold, the wharves, dock property and railways at the formation of the port of Melbourne were public property; and upon the establishment of the Melbourne Harbor Trust Commission the portion necessary for wharves and wet docks was, by the act of Parliament, vested in that body, on which borrowing powers have from time to time been conferred by the Legislature for the purpose of construction, etc.

Answer to Question No. 10:

The revenue derived from the docks and wharves is a charge upon the vessels and the cargo; the landing charge is a charge upon the cargo.

Answer to Question No. 11:

There is a direct main line railway connection with the docks and wharves.

Answer to Question No. 12:

The railway lines communicating with the docks and wharves, as well as all the lines of the colony, are owned and controlled by the government. Charges on goods between Melbourne and vessels lying at either the Port Melbourne or Williamstown piers (about five and one-half miles distant) are from fifty to seventy-five cents per ton, according to the character of the same.

Answer to Question No. 13:

It is difficult to apportion the success due to the railroad system.

Answer to Question No. 14:

There are private lighters and tug steamers in this port. The charges may be taken as seventy-three cents per ton, weight or measurement.

Answer to Question No. 15:

This port has no special distributing facilities which do not exist in all recently established ports.

Answer to Question No. 16:

In this port, when borrowed funds were available to construct docks and terminal facilities, the common failing was indulged in of providing accommodation considerably in advance of reasonable requirements, and the expenditure has not been warranted by results.

Answer to Question No. 17:

Wool and wheat.

Answer to Question No. 18:

It would be as well to conclude with the opinion of Dr. H. N. P. Wollaston, the permanent head of the department of trade and customs of this colony, on the question of public ownership of docks and wharves. He says: —

First. — Under ordinary conditions docks and wharfage facilities for ships should be owned and controlled by public representatives. The advantages to be derived thereby are as follows: —

A more ready and economical manner of obtaining possession of any land and water frontage required for the berthage of vessels than would be possible in the case of private ownership.

The regulation of port charges so as to aid the commercial prosperity of the district, whereas private owners when fixing charges would in all probability be guided solely by their personal interests, and under such circumstances the general commercial prosperity of the city would be detrimentally affected. As effecting the fixing of charges for the use of docking and wharfage facilities, it may further be mentioned that the large amount of money necessary to provide harbor accommodation for a first-class port could not be borrowed at so low a percentage by any private company as it could be by public representatives, who, moreover, might, as occasion required, be satisfied with a return equal to the interest on the borrowed capital, whereas private owners would not be in a position to accept a similar return on the capital cost.

Second. — The arguments used in defence of private ownership are that it insures competition and consequently reduces port charges, in addition to affording more prompt attention to the interests of merchants and shippers. Such arguments appear to assume that public representatives are unable to obtain as equally economical, honest and capable servants as private owners do, — otherwise these arguments are of no value.

Third. — Sea-port cities are dependent for their commercial growth upon the establishment of docks and wharfage facilities, and as an instance of this fact it may be mentioned that the city of Glasgow owes its present prosperity as a commercial centre and sea-port to the improvement of the river Clyde, — an improvement which would never have been effected by private enterprise.

Fourth. — It is difficult to instance any city with merchant shipping facilities that can trace its progress and prosperity to any other source than the establishment of public docks and wharfage facilities controlled by duly appointed public bodies.

It may be taken for granted that the success or otherwise of any undertaking of the character under notice mainly depends, in the first instance, on the experience and ability of the engineer engaged to design and carry out the required works, and, while preparing a scheme of dock facilities sufficient to meet all necessary requirements for many years, care should be taken not to provide docking facilities at any stage more than three years in advance of expected requirements

U. S. CONSULATE, MELBOURNE, Sept. 19, 1895.

MONTREAL (Canada).

[From the report of WENDELL A. ANDERSON, U. S. Consul-General.]

In considering the merits of this port and its shipping facilities, it should be borne in mind that it is practically a summer port, being ice-bound and closed to shipping nearly six months of the year, which is an insuperable obstacle to its progress in competition with the ports of the Atlantic sea-board.

The measure of success attained by this port is largely due to its being the natural junction of the ocean and inland shipping and located much nearer the majority of the population of the western part of the country, regarded both as consumers of imported goods and producers of exports.

It has been made accessible to mercantile vessels of the largest size by the deepening and improvement of the channel of the St. Lawrence River eastward nearly to Quebec. The harbor improvements from time to time have been made equal to the requirements resulting from the enlarged channel.

There is no tide to hamper vessels in loading or unloading. The harbor is well sheltered, and no sea can ever cause damage to vessels which are moored at wharves and very seldom have another vessel alongside (excepting grain elevators and barges with cargo for them). The ownership of the wharves is wholly public, and the control of same is vested in a Board of Harbor Commissioners, consisting of eleven members; of this body, six members are appointed by the Dominion government, and hold office during pleasure; the mayor of Montreal is a commissioner, *ex officio*; and four are elected, one each by the Board of Trade, Corn Exchange Association, District Chamber of Commerce and the shipping interest.

This control has been in the hands of the Harbor Commission for over sixty years, and, as no private wharves ever existed, there have been no private owners to arrange with. These commissioners are also pilotage authority of the Montreal district, extending from Montreal to Quebec, one hundred and sixty English statute miles.

The cost of constructing wharves and improvements of the harbor has been defrayed by issue of debentures, originally bearing interest at the rate of eight per cent., and lowering rates until now money is secured at about four per cent. The revenue to meet interest on the debt and for maintenance and management is at present derived from charges levied on cargoes in transit, both inwards and outwards. These dues have been considered quite burdensome on the transit trade by many, but the commission has been unable to reduce them on account of its obligation to bondholders. Tonnage dues on vessels have not been levied since 1888.

Respecting the comparative merits of public and private ownership there is quite a difference of opinion, although, as before stated, private ownership has never been tested here. On the one hand, it is thought to be of advantage to commerce to have, as at present, a uniform and well-considered tariff of charges and the same set of regulations. On the other hand, it is claimed that public ownership does not of itself afford any commercial advantages over private ownership, for, with the property in possession of numerous owners, and especially if the railroads had investments in the wharf property, there would be competition which would be of great value to shipping interests, especially during dull seasons.

There are two railway tracks extending the whole length of the harbor, with sidings, owned and controlled by the Harbor Commissioners; but the traffic is worked by the Grand Trunk and Canadian Pacific railways, to each of which a separate track is leased.

Vessels cannot discharge and receive freight direct into or from cars, but the transfer is made by wagons which have to pass over a few hundred feet of wharf space from vessels and sheds to the cars, and *vice versa*. For the use of these tracks on the wharves each railway pays to the commissioners one thousand dollars per annum for each mile of track used by it, and also pays the regular wharfage rate on goods landed on or carried away from the wharves by cars, which are not for or from vessels. The charges by railways on freight are included in the through rates made between them and vessels, and cover also the wharfage dues. For special local business the railways generally charge two dollars per car for switching from their own stations to the wharves.

These railway connections have been and are of the greatest value

to the foreign trade of the port, as regards all traffic excepting export grain.

There is no lighterage at this port, as casually understood. Vessels are, to a great extent, loaded from lumber barges, floating elevators, and a large cattle transfer boat from the river or outer side.

The terminal and distributing facilities are not equal to those of several of the principal ports in the United States. There is, however, the magnificent system of St. Lawrence canals, with a depth of nine feet of water as far as Lake Ontario, and the two great railways, the Grand Trunk and the Canadian Pacific, with their many connections westward, all competing for the ocean-borne traffic.

As to the traffic of the port, the imports consist largely of East and West Indian produce and European manufactured goods, the principal articles being sugar, tea, cotton and manufactures of wool, coal and iron; the principal exports are animals (cattle, horses and sheep), lumber, grain, cheese, butter, fish and meats.

U. S. Consulate, Montreal, Nov. 16, 1895.

The following extract from the "Transport," published in London, Eng., gives in condensed form a very clear and correct review of the growth and present condition of the harbor of Montreal: —

Originally there were shoal places in Lake St. Peter and elsewhere which prevented vessels drawing over 10 feet of water from reaching Montreal during low water in autumn. In 1844 the deepening of these by dredging was undertaken by the Canadian government, but the work was shortly afterward handed over to the Harbor Commissioners of Montreal, by whom it was continued until 1865, when a ship channel of 20 feet depth at low water had been attained. Deepening was resumed in 1874 and carried through to 22 feet in 1878, then continued till 25 feet was attained in 1882, and then prosecuted until 1888, when 27½ feet had been attained at ordinary tides in all parts of the river subject to tidal influence, and at lowest water in autumn in the part of the river which is beyond the influence of the tides. At this stage the deepening was undertaken by the Dominion government, and the Harbor Commissioners were reimbursed their expenditure. Government continued the work for the attainment of a depth of 27½ feet at lowest water in the tidal portions, as had been done elsewhere, and this is now nearly completed.

For the inland navigation above Montreal magnificent systems of canals have been provided by the government. The Ottawa and

Rideau canals, with locks of a minimum size of 134 by 33 by 5 feet, were opened through in 1834, and give access to Lake Ontario, which had already been connected with the upper great lakes by canals. The famous St. Lawrence canals, with locks of 200 by 45 by 9 feet, were completed in 1849, between Lake Ontario and ocean ports. These in turn are now being enlarged to a lock capacity of 270 by 45 by 14 feet depth of water, capable of passing steamers carrying 1,800 tons weight of cargo.

The harbor of Montreal has grown with the commerce brought to it by the ship channel and canals. In 1825 there were only two small wharves, with a combined frontage of about 1,120 feet and 2 feet depth of water at low stage. In 1830 the Harbor Commissioners of Montreal were constituted by government for the management of the harbor, and by them the construction of the first regular system of wharfage was undertaken. Between 1830 and 1832 several of the present wharves, including the Island wharf and those immediately above and below it, were built, with from 5 to 25 feet in front of them, replacing such of the original shallow-water wharves as remained, and increasing the wharfage to nearly a mile of frontage. No further additions were made until 1840, but in that and the following six years extensions were made both above and below those of 1830 and 1832, increasing the total frontage to 1.55 miles.

The basins of the enlarged Lachine canal, opened in the spring of 1848, supplied a considerable extent of wharfage; but in the harbor proper, excepting two new wharves built in 10 feet of water in the lower part, no further additions were made to the wharfage until 1856. The dredging operations for deepening the river below the city were by that time sufficiently advanced to allow of vessels reaching Montreal with a draught of 13 feet at ordinary low water, and further deepening was determined upon. A regular line of steamers between Montreal and Liverpool had also been established, and the necessity for deep-water frontage which thus arose has been met by the construction of a wharf in 20 feet of water at the lower limits of the city and below the current of St. Mary. The deepening of the shallow upper parts of the harbor and the rebuilding of some of the old wharves to a greater depth was also undertaken about the same time.

The deepening and improvement of the central part of the harbor and the extension of its wharves upward and downward have been regularly continued to the present time, as the deepening of the ship channel and the increase of trade demanded, until there is now a line of wharves from Point St. Charles to Hochelaga, with a frontage of over 5 miles. In order to further meet the requirements of growing trade, a systematic plan of harbor enlargement, and of protection to

the city from floods caused by ice blockades, was devised by the harbor engineer, Mr. John Kennedy, M. Inst. C.E. This, after modification, to meet as far as practicable the views of representatives of the city, of ocean and inland shipping and of the railway and other interests, was adopted by the harbor and city authorities, and construction was commenced in 1891.

The upper part of the harbor is to be enclosed by an embankment 1½ miles in length, so placed as to protect the enclosed area from the violent action of the ice and from the strong current of the main river. The enclosed basin will thus be converted into a slack-water basin, in which vessels can be safely and conveniently moved about in summer or laid up in winter, and on the wharves of which permanent warehouses or other structures may be erected. Within the lower part of the basin there are to be four large pier wharves, 230 feet wide by 1,040 to 1,550 feet in length, all connected with the main shore wharves, and placed at such angles as to afford easy access for ships as well as for railway cars and ordinary vehicles. The front street is to be widened and the low-lying parts of the city are to be protected from floods by a parapet wall carried along between the street and the wharves. In the wall there are to be ample openings for traffic, with water-tight gates, to be closed in flood time.

The basins will in the first instance be made 27½ feet deep at low water, the depth of the ship channel to sea, but the wharves will be founded at such depth as to allow of subsequent deepening to 30 feet. The whole discharge of the Lachine canal locks and milling power will be through the basin, the volume being sufficient to change the contents twice a day, and it will, therefore, be kept in wholesome condition. The deep-water frontage afforded by the four new piers and the new shore wharves between the foot of the canal and Victoria pier will be 14,050 linear feet. This will supersede 5,723 linear feet of deep-water front and 2,564 feet of shallow-water front, or in all 8,287 linear feet of existing wharfage, thus giving in the most valuable part of the harbor 5,763 feet increase of space, and converting the whole into wharfage suitable for ocean vessels of the largest class. The outer embankment, or guard pier, is already half built, and a considerable part of the dredging of the basins is done. The disposition of the upper part of the basin, above the foot of the canal, is not yet determined upon, but the site is favorable for a high-level dock, entered from below by a lock and connected above with the basins of the canal.

At Hochelaga, the down-stream end of the harbor, the project comprises a stretch of shore wharves and five piers, 180 feet wide by 500 to 850 feet long, making in all a wharf frontage of 7,987 linear feet, all of 27½ feet depth at low water. Of this, th

stretch of shore wharf and the lowermost pier are already built, and a second pier is under construction. An additional project, not yet adopted, is the construction of extensive inland docks at Hochelaga in rear of the new piers. The present capacity of the harbor, and its capacity when enlarged according to the adopted project, are as follows: —

Capacity at Beginning of 1895.

	Linear Feet.
Wharfage of 27½ feet depth at low water,	18,128
Wharfage of 25 feet to 20 feet depth at low water,	2,650
Wharfage under 20 feet depth at low water,	6,184
	26,962

Future Capacity (under Adopted Project).

	Linear Feet.
Wharfage of 27½ feet depth at low water,	37,092
Wharfage under 20 feet at low water,	3,620
	40,712

At the date of Canadian confederation, 1867, the indebtedness of the harbor was about $1,126,000; since that time there has been expended on it over $2,850,000, making in all $3,975,000; the present indebtedness is $2,840,000, being a difference of $1,135,000, which has been paid out of the revenue. The whole of this has been provided by the Harbor Commissioners, and the interest on the borrowed portion is met by wharfage dues levied on the cargoes, the vessels themselves being free.

The following table shows the number and tonnage of sea-going and inland vessels which arrived in port during the last ten years, and the values of the imports and exports of the port for the same period: —

YEAR.	Sea-going Vessels.		Inland Vessels.		Value of Merchandise Exported.	Value of Merchandise Imported.
	Number.	Tonnage.	Number.	Tonnage.		
1885,	629	683,854	5,003	724,975	$25,274,898	$37,413,250
1886,	703	809,699	5,521	809,819	28,078,830	40,469,912
1887,	767	807,773	5,367	791,452	29,391,798	43,100,183
1888,	655	782,473	5,500	863,014	24,049,638	39,866,527
1889,	695	823,165	5,847	1,069,709	32,638,270	47,191,888
1890,	746	930,332	5,162	966,959	32,027,176	44,102,786
1891,	725	938,657	5,268	1,119,484	39,464,783	48,418,569
1892,	735	1,036,707	5,200	1,049,600	45,648,310	47,667,408
1893,	804	1,151,777	5,244	1,153,600	48,205,531	53,796,061
1894,	734	1,096,909	4,666	979,809	40,710,700	42,514,597

The tonnages are confined to the seven months during which navigation is open, but the imports and exports cover the whole of each year.

NEWCASTLE-UPON-TYNE (England).

[The report of WILLIAM S. CAMPBELL, U. S. Consul]

The river Tyne, before the commencement of the present admirable improvements made under the administration of the Tyne Commissioners, — a commission created by act of Parliament in 1850 and authorized to borrow £4,312,000 sterling for the improvement of its navigation, — was a shallow and tortuous stream, with a bar at its mouth, and only navigable at high water, and above a point 12 miles from its mouth, for boats and small craft, and exposed at its entrance to the heavy seas and rollers from the North Sea during the frequent easterly storms. In this work the commissioners have already expended about £4,025,000 sterling.

Now the heaviest armored ships of war are built upon its shores and, from a distance of 15 miles from its mouth, sent successfully to sea with all armament on board; Newcastle stands in the first rank of British ports, and the most important one on the east coast of England; and the river Tyne for 15 miles presents a spectacle of busy industry that cannot be witnessed on any other river in Great Britain or in the world. In accomplishing all this marvellous transformation and in building the swing bridge, it is stated that more than £11,000,000 sterling have been expended.

The docks constructed are: Northumberland dock, 55 acres area; Albert Edward dock, 25 acres area; Tyne dock, 50 acres area. The Tyne dock is the property of the North-eastern Railway Corporation; its tolls and charges are identical with those of the commissioners' docks. There are also extensive stone quays at which large vessels can load or discharge cargo and long lines of mooring buoys on either side of the central channel.

In addition to these, there are no less than twenty-one graving docks and fourteen repairing slips, some of them capable of accommodating the largest class of vessels, and 90 acres of timber ponds for the accommodation of the timber trade.

In all the docks, and some of the quays, are numerous coal spouts (called staiths), capable of loading into the same vessel from 800 to 1,000 tons of coal per hour.

The piers, or jetties, at the mouth of the river were commenced

about forty years ago, and are only just now declared finished. These are most substantial, and their construction has been attended with great difficulties, and upon them over £2,000,000 sterling have been expended.

The north pier is 3,059 feet in length, the south pier is 5,317 feet in length, and the entrance between them is about 1,300 feet wide; these serve not only to protect the river from the heavy rollers from the sea in easterly storms, but form the harbor of refuge, of which more than 500 vessels have availed in a single year.

The foregoing sketch I have thought necessary to an intelligent comprehension of the special conditions which attach to the Tyne port, and will meet the first seven questions of the circular.

Answer to Question No. 8:

The commissioners believe that public ownership of docks is to the advantage of commerce, as a public administration is not seeking to make dividends, and has no other motive than to benefit and consequently extend the trade of the port.

Answer to Question No. 10:

The revenue from the docks and quays and light and river dues come from both ships and goods, the ship paying for landing goods on the dock quays. The revenue amounted to £332,000 sterling the past year.

Answer to Question No. 11:

In all the docks are lines of railway, connecting with the main lines of the entire kingdom, and vessels can discharge or receive cargo direct from the cars.

Answer to Question No. 12:

The commissioners own and control the lines within their dock estate; these connect with the railways of the North-eastern Railway Company.

Answer to Question No. 13:

Without the railway connections business could not be successfully carried on.

Answer to Question No. 14:

There are steam lighters, principally for goods to or from the city to the docks; they belong to private owners, and the charges are moderate.

Answer to Question No. 15:

The terminal and distributing facilities here are about the same in all the principal ports in the kingdom.

Answer to Question No. 16:

The commissioners state they have no such knowledge.

Answer to Question No. 17:

The principal staple of exports is coal and coke, the product of the mines of Northumberland and Durham; the shipment for the past year was a little over 1,000,000 tons per month.

Answer to Question No. 18:

A sinking fund is provided for the payment of all indebtedness. In 1947 the river will be free.

U. S. CONSULATE, NEWCASTLE-UPON-TYNE, Aug. 17, 1895.

The following communication was also received: —

TYNE IMPROVEMENT COMMISSION,
NEWCASTLE-UPON-TYNE, July 2, 1895.

The Tyne Improvement Commissioners are a body constituted by an act of Parliament passed in the year 1850. They consist of twenty-four members, viz.: one life member named in the act of 1850; two life members appointed by the Board of Trade under the provisions of the same act; fifteen members appointed annually by the corporations on the banks of the Tyne, viz., six by Newcastle Corporation, two by Gateshead Corporation, three by Tynemouth Corporation, three by South Shields Corporation, one by Jarrow Corporation; six members appointed triennially by the three classes of due payers, viz., two by ship owners, two by coal owners, two by traders. They receive no payment whatever for their services.

Since the commission was formed there has been expended out of the taxation which the commissioners are authorized by their various

acts to levy on shipping and on merchandise carried therein large sums of money in deepening, straightening and widening the river, building piers at the entrance to the harbor and making docks, shipping places, etc. These works and improvements have conduced to the great development of the trade and commerce of the port and the district which it serves.

Under the provisions of their special acts the commissioners are authorized to borrow £4,312,000 on the security of the rates, tolls and dues leviable by them, and they have up to the present time borrowed about £4,225,000. They are required to repay the whole of the money borrowed by them by the year 1947, when of course the port will practically be free.

The following answers your several queries, viz.: —

Answer to Question No. 1:

To the successful carrying out by the Tyne commissioners of a comprehensive scheme of river improvement, the construction by them of extensive piers at the entrance to the harbor, and of docks and coal shipping staiths, etc., in the port.

Answer to Question No. 2:

The position of the Tyne makes it the most important port on the north-east coast of England, and the principal outlet for a large portion of the coal fields of Northumberland and Durham.

Answer to Questions Nos. 3 and 4:

The port and docks belonging to the commissioners are administered and controlled by them solely in the interest of the public, without regard to the earning of dividends, as in the case where ports and docks belong to private owners; which is naturally conducive to the success of the port, and to the advantage of those who use it.

Answer to Question No. 5:

The conservancy and management of the port are entirely in the hands of the Tyne Improvement Commission.

For answers to questions Nos. 6, 7 and 8 see above.

Answer to Question No. 9:

The conservancy of the port was formerly in the hands of the Corporation of Newcastle-on-Tyne, who levied dues on shipping and on

imports and exports. By the act of 1850, forming this commission, the powers, duties and jurisdiction of the corporation as conservators of the river and port were transferred to the commissioners, and by this and subsequent acts of Parliament the commissioners were authorized to levy dues on shipping and on imports and exports.

Answer to Question No. 10:

The ship pays the charges for landing goods onto the dock quays.

Answer to Question No. 11:

Yes; direct connections between the commissioners' docks and the railway systems of the country exist.

Answer to Question No. 12:

Yes; the commissioners own and control a line of railway within their dock estate nearly a mile long, connecting the docks with the railways of the North-eastern Railway Company, and through that company's railways with the other railways of the country.

Answer to Question No. 13:

Without railway connections business could not be carried on with success or advantage.

Answer to Question No. 14:

The commissioners do not perform lighterage. This is done by private firms, who make their own charges.

Answer to Question No. 15:

The terminal and distributing facilities of the port are similar to those of other similar ports in this country.

Answer to Question No. 16:

No.

Answer to Question No. 17:

Coal exports and general imports and exports.

R. Irwin,

Secretary Tyne Improvement Commission

Newcastle-upon-Tyne, July 2, 1895.

ODESSA (Russia).

[From the report of THOMAS E. HEENAN, U. S. Consul.]

Answer to Question No. 1:

Odessa has no rival on the Black Sea. Its success is attributable to its location, being the natural outlet for an enormous extent of farming country.

Answer to Question No. 2:

The physical features of the Odessa harbor contribute but little to its success, as it may be said to be situated almost entirely on an open sea.

Answer to Questions Nos. 3 to 9 inclusive:

The entire management and control of all harbors in Russia, as well as the ownership of all landing docks, wharves and quays, are vested in the imperial government.

Answer to Question No. 10:

The entire revenue of the docks and quays comes from charges on the vessels, in shape of light dues, tonnage dues, etc. The light dues ($3.60) are payable by all classes of sea-going vessels, native and foreign, every time they enter a port in this country, whether laden or in ballast. The charges are the same at all ports, whether there are lights or not. Tonnage dues are collected from all classes of vessels, laden or in ballast, native or foreign, and engaged in all trades; the rate of 5 copecks, or 2½ cents, per last inwards, and 5 copecks per last outwards. The last equals two tons. There are no special privileges. Passenger steamers running on a regular line only pay dues once for the season. Lastage and anchorage dues at Odessa for foreign-going vessels are 29 copecks (14½ cents) per last, one last being equal to two British net tons registered. Mail steamers of all nationalities, with regular departures and arrivals, pay full dues first voyage of each year and half dues after. All of these charges are levied by the customs authorities. Russian vessels engaged in the coasting trade (and there are none other) pay 10 copecks per last, which is levied by the town authorities. The landing charges are paid by the cargo, which is taken from the deck of the ship to the quay for 1 cent for every 36 pounds weight.

Answer to Question No. 11:

Direct railroad connection with the docks and piers, so that vessels can discharge and receive freight from trains.

Answer to Question No. 12:

There is a local line of railway, both elevated and on the level, connecting the main lines with the docks. It is owned and controlled by the Russian government. The rate from the grain magazines to the port by rail is 9 cents per 360 pounds; the distance is 2½ miles. The grain is carried in bulk.

Answer to Question No. 13:

The export of cereals from the port of Odessa for the year ending Dec. 31, 1894, was 2,500,000 tons, of which the railway carried 1,500,000 and the waterways 1,000,000 tons.

Answer to Question No. 14:

Vessels drawing 26 feet of water can load at this port, hence there is no necessity for lighterage.

Answer to Question No. 15:

It will take several years to complete the work on the improvements of the Odessa harbor. The present terminal and distributing facilities are very good, but they are inadequate to the ever-growing demands of the trade of the port.

Answer to Question No. 16:

Public funds, and public funds only, are employed for docks and terminal facilities.

Answer to Question No. 17:

The chief staple of traffic consists in the export of cereals.

Answer to Question No. 18:

Export cargoes pay ½ copeck per pood (36 pounds) to the municipality of Odessa, which sum is devoted to the paving and repairing of streets.

U. S. Consulate, Odessa, Oct. 31, 1895.

QUEBEC (Canada).

[From the report of PHILLIP B. SPENCE, U. S. Consul.]

The port of Quebec can boast of exceptional facilities for the accommodation of shipping. In her harbor, notwithstanding that it is hundreds of miles from the sea, the entire British navy might safely ride at anchor. It extends from the mouth of the Chaudiere on the west to St. Patrick's Hole on the east, a distance of over ten miles in length, the river being lined through, on either side, with wharves or booms, with the exception of where it washes the Beauport beach, while the new Princess Louise docks at the mouth of the St. Charles are the admiration of all who see them.

These docks are of comparatively modern construction, and by the people of Quebec great things are expected in the shape of increased commerce from the facilities afforded by these new works, which have been made under Federal government control by the Quebec Harbor Commission. Almost all the other wharves and docks of this port — with the exception of the government graving dock on the Levis, or south side of the river, and the Queen's wharf on the Quebec side, immediately under the citadel — are private property. The Queen's wharf is the property of the Federal department of marine and fisheries, and is used by the government steamers that supply the lighthouses, attend to the buoys and protect the fisheries. Of other public property, some is held by the city corporation of Quebec for the accommodation of market steamers from outlying country parishes, who pay wharfage for the use thereof. Some few wharves along the city front, although the property of the Harbor Commissioners, are, in their management, virtually private wharves, being leased by the commission to mercantile importing firms and the Quebec Steamship Company, which runs vessels to the Gulf ports and the West Indies.

Other wharves are owned respectively by the Allan Mail Steamship Company, the Richelieu & Ontario Navigation Company, running steamers hence both to Montreal and the Saguenay, and by the Quebec & Levis Ferry Company. Outside of the above-mentioned wharves, which are used by the vessels belonging to their owners, the value of most of the private wharf property in this port has so diminished within the past twenty-five years that much of it is now practically useless. This is directly traceable to the vast decline in the square timber export trade, and the general substitution of steamships for sailing vessels in the deal carrying trade.

The decrease in the volume of shipping at this port may be seen

by the fact that, while the number of vessels entered inwards and outwards at Quebec was 1,004 and 1,007 respectively in 1870, it was 849 and 842 respectively in 1880, 480 and 458 in 1890, and 389 and 294 in 1894. The disproportion in tonnage is not quite so large, because steamships of great burden have largely taken the place of sailing vessels, as already reported.

Many of the private wharves heretofore used for the accommodation of sailing ships are unavailable for large steamships, not having sufficient frontage; but, even if they had, they would not be utilized, as outside of the regular liners which use their own wharves, or (when landing immigrants) the Harbor Commissioners' wharf, upon which the government immigration buildings are erected, most steamships that take on or put off cargo in this port either anchor in the stream and use lighters for the purpose, or moor to the Louise docks, though some few utilize suitable private wharves situated in what are known as the timber coves, a little west of the city, and importers of whole cargoes of coal, salt, etc., discharge steamships at their own wharves, generally situated along the city front.

The harbor improvements in the mouth of the St. Charles have been virtually constructed by government. The Harbor Commission, under the provisions of special legislation, issued debentures to pay for the work, and interest upon those debentures is guaranteed by government. The commission consists of nine members, of whom five, a controlling majority, are named by the government, two are elected triennially by members of the mercantile element paying a certain amount of harbor dues in the port, one by the Quebec Board of Trade and one by the Levis Board of Trade. Over $3,200,000 has been expended by the commission upon these works. The exterior of these works is formed by the Princess Louise embankment and quay wall on the north side of the docks, which is 3,960 feet long and 330 wide. Upon it are the Dominion government immigration buildings, the Castle Garden of Canada, several railway lines and sidings, the Canadian Pacific Railway grain elevator and numbers of warehouses and storehouses. Cold-storage facilities are shortly to be provided.

The space enclosed between this embankment and the wharves which jut out from St. Andrew Street, on the other side, is divided into two unequal parts by the cross wall, furnished with an opening controlled by water gates. This space is nearly 60 acres in extent. The outer or tidal basin is 20 acres in area and 25 feet deep at the height of the lowest tides for a length of 1,250 feet, and the inner one 36 acres in area and 25 feet deep for a distance of 2,160 feet. The largest vessel afloat can therefore enter these docks and lie in

perfectly land-locked water, while taking on cargoes from alongside cars which run down upon the wharves from the Canadian Pacific, Lake St. John and other railways.

The revenue of the Harbor Commission so far is barely sufficient, after paying working expenses, to leave one per cent. for interest upon the cost of the work. Last year the receipts were $65,650.02. The revenue of the commission comes from moorage and wharfage dues, and for the payment of the latter the owner of the cargo is responsible.

So far the success following the construction of these works has not been equal to what was expected of it. This is partly due to the tendency of ships to run as far inland as possible, which will be overcome to some extent if the proposed fast Atlantic steamship line to the St. Lawrence becomes an established fact, as their greater draught will prevent them ascending the river to Montreal. Another reason why Quebec's shipping has not progressed in proportion with its improved facilities is that Canada's largest exporters of wheat, flour, cattle, etc., are all personally interested in the success and prosperity of the port of Montreal, and so overlook the superior advantages of shipping from Quebec, especially of live cattle, hundreds of which often die of the heat on ship's passage from Montreal to Quebec. An improvement is looked for here as soon as Quebec's advantages are more generally recognized by Canadian shippers, and when the increase in the shipments of grain from the north-west shall overtax the resources of the city of Montreal. The question of government or other public ownership or control of wharves or docks here does not, therefore, enter into the question of the success and prosperity or otherwise of the port of Quebec.

So far in this report upon the docks and wharves of Quebec, the matter of supplying information that would serve as answers to the questions prepared by the Massachusetts State Board on Docks and Terminal Facilities has been kept constantly in mind. In case any have been overlooked, it may be well to report further and categorically upon them, as follows: —

Answer to Question No. 1:

The measure of success that is enjoyed by the port of Quebec is largely due to its natural advantages, but much of it would be wanting but for the improved facilities afforded by the public harbor works at the mouth of the St. Charles.

Answer to Question No. 2:

Amongst the physical advantages of the port of Quebec are the extent and sheltered character of its harbor; the depth of its water, which has enabled the "Great Eastern" to swing at anchor opposite the city; its excellent anchorage and absence of great heat rendering it especially favorable, if the fact were only more generally recognized, for the shipment of live stock, dairy produce and grain.

Answer to Question No. 3:

To no extent whatever.

Answer to Question No. 4:

Not at all.

Answer to Question No. 5:

Already fully answered in first part of this present report.

Answer to Question No. 6:

Same answer as to the preceding question.

Answer to Question No. 7:

Not at all.

Answer to Question No. 8:

Can only say that so far as Quebec is concerned, without public control of the property in and about the mouth of the St. Charles there would have been none of the improvements made by the Harbor Commission. Private enterprise here would not have proved equal to the undertaking.

Answer to Question No. 9:

Where public ownership exists here, wharves were purchased from former owners at prices mutually agreed upon by the Harbor Commission and city corporation, and paid for by the sale of debentures.

Answer to Question No. 10:

Charges on cargoes yield the principal part of the revenue of wharves and quays, and owners of cargoes are responsible therefor.

Answer to Question No. 11:

Yes; with Canadian Pacific Railway and connections and Lake St. John Railway and connections upon the Louise embankment on the Quebec side of the river, and with Grand Trunk, Intercolonial and Quebec Central railways and their connections on the Levis or south side of the river.

Answer to Question No. 12:

No; direct communication.

Answer to Question No. 13:

A large proportion of the deals shipped here are brought down by rail, especially upon the Lake St. John Railway; and if, as many expect, a grain export and cattle-shipping trade be established here, both grain and cattle will be brought here by rail from the west.

Answer to Question No. 14:

Apart from changing cargoes directly from vessels to wharves, or *vice versa*, and from vessels to cars, or *vice versa*, there are timber towers that with small tugs tow cribs of timber to the sides of vessels, whence they are taken into the hold by the port-holes. A number of batteaux are also employed by shippers in carrying out cargoes of deals or merchandise to the side of steamers or ships anchoring in the stream or in receiving portions of cargo for Quebec from incoming vessels. Charges vary, but are low.

Answer to Question No. 15:

Quebec has many and great terminal and distributing facilities. The extension of the Canadian Pacific Railway onto the Louise embankment is the real eastern terminus on Canadian territory and on the St. Lawrence of that great transcontinental railway. The similar extension of the Quebec and Lake St. John Railway is the southerly terminus of that road, which runs through a great lumbering country, and will eventually also be the easterly terminus of the Quebec &

Parry Sound Railway, intended to make the shortest possible route between Duluth and the sea, and now in course of construction. In the port of Quebec are also the eastern terminus of the Grand Trunk Railway on the St. Lawrence, the western terminus of the Intercolonial Railway of Canada, and the northern terminus of the Quebec Central Railway, which runs through the gold fields of the Chaudiere and the asbestos country of Megantic, and has direct connections with the Maine Central and Boston & Maine railways. In addition to all the distributing facilities which these roads give, Quebec is able to trans-ship cargo from vessels arriving here from sea and distribute it hundreds of miles west of Montreal by rail before it could be unloaded from the same vessel in the port of Montreal upon its arrival there.

Answer to Question No. 16:

Not outside of Quebec.

Answer to Question No. 17:

Lumber is the chief staple of exports.

Answer to Question No. 18:

Mention may be made of the fact that the government graving dock at Levis on the south side of this port is capable of receiving vessels nearly 500 feet long, and may be enlarged if necessary. It cost over $900,000. It was necessary for the large class of steamships running to the St. Lawrence, for the accommodation of which private enterprise would scarcely have provided. At the same time, it has reduced the business and value of smaller docks in private hands. Similarly, too, the public wharves and docks at the mouth of the St. Charles, though in many respects a boon to the port, have entered into ruinous competition with some private wharf owners.

It may be remarked that the season of shipping at Quebec only lasts from the end of April to the end of November, though winter navigation of the St. Lawrence as far as Quebec is now known to be feasible, and a steam ferry crosses the river here all the winter through.

U. S. Consulate, Quebec, September, 1895.

ROTTERDAM (The Netherlands).

[From the report of LARS S. REQUE, U. S. Consul.]

Rotterdam has taken its place among the great sea-ports of the world. How rapid has been its recent growth appears from the subject table, showing the number and tonnage of sea-going vessels annually entering the port: —

YEAR.	Number of Vessels.	Net Tonnage.	YEAR.	Number of Vessels.	Net Tonnage.
1850, ...	1,970	393,393	1875, ...	3,485	1,654,670
1855, ...	2,247	513,971	1880, ...	3,510	1,728,305
1860, ...	2,449	673,839	1885, ...	3,724	2,120,347
1865, ...	2,459	653,450	1890, ...	4,535	2,918,425
1870, ...	2,987	1,189,571	1895, ...	5,199	4,214,940*

* The statement does not include 2,300 fishing smacks and 32 foreign tug boats.

A comparison of Rotterdam with other sea-ports will further show its rank as such: —

	1893.		1894.		INCREASE OVER 1893.			
	Ships.	Tonnage.	Ships.	Tonnage.	Ships.	Per Cent.	Tonnage.	Per Cent.
Hamburg, .	8,792	5,886,000	9,165	6,228,821	373	4.2	342,821	5.8
Antwerp, .	4,418	4,692,211	4,640	5,008,983	222	5.0	316,772	6.7
Amsterdam, .	1,558	1,152,339	1,666	1,281,340	108	7.2	129,001	11.1
Rotterdam, .	4,631	3,566,170	5,109	4,143,403	478	10.0	377,223	16.1

The phenomenal growth and prosperity of the port of Rotterdam, evidenced by the above statistics, is attributable, no doubt, to a complexity of causes, — as chief and fundamental among these must be regarded its exceptionally favorable location as a natural terminal and distributing point for a very important industrial section of central and north-western Europe.

Situated on the New Maas, which at present forms the main outlet of the Rhine, Rotterdam practically enjoys a monopoly of the rapidly increasing trade on this great commercial artery, and can offer cheaper rates and quicker transportation for merchandise destined for or coming from any point along the Rhine or immediately tributary thereto, than any of its sea-port rivals.

The Rhine is now navigable as far as Cologne by boats drawing from 9 to 10 feet of water, and the channel is being constantly deepened. Some of these Rhine boats approach 300 feet in length and have a carrying capacity of nearly 2,000 tons. From Cologne to Mayence, Frankfort and Mannheim, the available depth of the Rhine and Main is from 6½ to 8 feet, and boats of several hundred tons burden proceed as far as Strasburg, while smaller craft ascend to the very frontier of Switzerland.

Holland's share of the Rhine traffic appears from the following statistics: —

In 1894, 41,117 vessels passed the German customs station at Emmerich on their way to or from Germany. Of these vessels, 33,818 carried the Dutch flag. The total movement of merchandise between Holland and Germany aggregated, in 1894, 6,401,158 tons; in 1893, 5,423,418 tons, — an increase for 1894 of 977,740 tons. Of this, Rotterdam's share was in 1893 3,290,048 tons and in 1894 4,130,074 tons, — an increase for 1894 of 840,026 tons.

Inland navigation from Rotterdam is not limited to the Rhine. An admirable network of deep and well-kept canals, over 2,200 miles aggregate length, connects the port with every part of the Netherlands. There is not a village of any importance which does not send its boat to the Monday and Thursday markets at Rotterdam. On these days some 1,600 canal boats may be seen crowded into the numerous havens of the city, presenting a most picturesque and animated view. Leaving out of account craft of less than 10 cubic metres, the city was visited in 1894 by no less than 78,713 canal and river boats, aggregating in carrying capacity 9,210,850 metres. The total number of inland craft visiting this port in the above year was probably not less than 100,000, and there is a steady increase both in number and size of boats.

But, favorable as is Rotterdam's geographical position, its prosperity is by no means due to that alone. Difficulties of the gravest nature have presented themselves and have been courageously met and successfully overcome. No labor has been too arduous, no sacrifice too great. Rotterdam, port and city, is in this respect, as indeed is the very country itself of which it forms a part, one grand monument to human energy, skill and perseverance. Every house of the city, every wall of its extensive quays and docks, rests upon huge timbers, driven through half a hundred feet of oozing mire to find a solid foundation in the bed of sand left by the retreating sea; and every stone and timber of the entire structure has been brought from foreign lands.

The introduction of steam as the propelling power in navigation,

with the consequent increase in size and draught of vessels, has during the latter half of the present century caused the decline of many flourishing sea-ports, and built up others which, either by reason of their natural advantage or the enterprise of their citizens, have been enabled to offer to these modern ocean monsters an easier approach and a safer haven of rest. The creation of a new waterway from Rotterdam to the sea is the great enterprise to which the recent expansion and present flourishing growth of this sea-port is immediately attributable.

In 1880 the depth of the waterway was still only 46 decimetres, or a trifle over 15 feet at high water. Since that time the work has been so vigorously pushed that in 1893 the depth has been more than doubled. The average difference between high and low water at the hook of Holland, where the new waterway pierces the dunes and opens into the sea, is about 5½ feet. At Rotterdam, 16 to 18 miles up the stream, the average difference is about 4 feet, though often much greater. The results of the deepening of the waterway have been brilliant. The tonnage of maritime shipping has doubled within the last ten years and the canal tonnage has increased in very nearly the same ratio, reaching, in 1894, 9,210,850 cubic metres.

That this immense increase of traffic has necessitated extensive and expensive enlargements and improvements of harbor facilities need hardly be stated. Happily, the physical features of the port of Rotterdam are such as to admit of practically unlimited expansion provided the money and energy be found to carry on the work; and hitherto no effort has been spared to meet the requirements of increasing commerce. The citizens of Rotterdam seem fully alive to the importance of this work, and expend annually vast sums of money in dredging rivers, excavating harbors, building quays and equipping them with the most approved modern appliances.

The total length of stone and brick built quays now finished is something over 14 English miles, and several are in process of construction. The excavation of a new harbor or basin has recently been begun, which when finished will be 2 kilometres, or 1⅓ miles, long, 320 metres, or 1,050 feet, wide, giving 138 acres of new water area and about 3 miles of additional quayage. The completion of this harbor involves the removal of some 6,000,000 cubic yards of earth.

In addition to the berthing places along the quays, twenty-six mooring buoys have been placed along the middle channel of the Maas. These moorings are preferred by vessels carrying transit goods, as a vessel so berthed can discharge into two lighters or river boats simultaneously.

The quays are well provided with the necessary apparatus for handling merchandise. Cranes, fixed and movable, and operated by hand, by steam, by hydraulic pressure or by electricity, can be hired at moderate prices. There are in all about seventy-five of these hoisting machines, varying in lifting power from 1½ to 60 tons.

One of the most powerful and expeditious lifting mechanisms of its kind is, perhaps, the coal hoist built by the city in 1886, by which a railway car loaded with coal is raised to an elevation of 30 feet and then tipped so as to discharge its contents along an inclined plane directly into the bunkers of the vessel. Twenty car-loads or 200 tons of coal can thus be handled in one hour, at a charge of 4 cents per ton. Another coal hoist of the same capacity is in process of construction.

The city has three floating docks, dry docks. The largest is 335 feet in length, and has a lifting power of 17 tons per running foot; the other two docks have a length of 275 and 146 feet respectively, and a lifting power of 14 tons per foot. All the docks are 84 feet wide, and admit of different combinations. There are also other and smaller floating docks of private ownership and a large number of ship-building yards and fitting and repairing shops in and near Rotterdam. The largest of these establishments is that of the Netherlands Steamship Company of Feyenoord.

With the exception of the east quay of the Spoorweg Haven, which is owned by the State Railway, and the ship-building yards and wharves, all quays, wharves and docks are owned and controlled by the municipality of Rotterdam. The city has from time to time, as its limits have been extended, acquired by purchase the river frontage and other ground necessary for the extension of its harbor facilities. The necessary funds for the purchase of grounds, as well as for the extension and maintenance of its public works, the city has secured by the issue of bonds bearing a low rate of interest. The terms of these bonds are such as to permit a certain number or amount of them to be annually drawn by lot for redemption. The interest thus saved is added to the sum set aside out of the city revenues for the redemption of its bonds, and the amount of bonds annually redeemed is thus increased by so much from year to year. The bonds can also be reduced in toto, or converted into bonds bearing a lower rate of interest, at any time the city may feel able to do so. At the close of 1894 such redemption and conversion took place in connection with a new issue of bonds to the amount of 32,000,000 guilders ($13,200,000), which was readily taken at 98 per cent. of its face value.

The harbors, docks, quays, quay space and warehouses are con-

trolled by the city council of Rotterdam, through committees appointed from among its members. The entire harbor service is divided into four departments, the heads or chiefs of which respectively are the director of public works, the harbor master, the director of the Handelinrichtingen (superintendent of quays and quay equipments, warehouses, etc.), the dock master, or manager of the dry docks.

The advantages of public ownership and control of docks, quays and wharves are so many and so obvious that to undertake to point them out seems little better than waste of words. A great and successful sea-port can be built up only by united effort. The docks, quays and necessary mechanical appliances are part and parcel of the port and harbor. How the harmony, order and method so essential to the development and successful administration of vast and varied interests can be secured unless the sea-port and its harbor service in their entirety be subjected to the direction of one central controlling power is, indeed, difficult to understand.

The harbor charges at Rotterdam are very moderate, considerably less it is said than those exacted by neighboring sea-ports. No landing charges are made. Vessels retaining fixed berths along the quays, as is the case with ships of regular lines, and inland craft coming to the weekly markets, pay, in addition to the tonnage charges, what are called quay dues.

The open quay space may be used for the temporary deposit of goods. If the goods remain more than two days, a charge of 4 cents per day is made for every 25 square metres, or less, occupied. In the public warehouses the charge is according to the space occupied. The rate is $1.20 per every 100 square metres or less for the first three days or less, and 40 cents for each succeeding day. Quay space and warehouse room can also be rented for longer periods. Several of the more important steamship companies have built their own warehouses upon sites rented for a term of years. The average yearly rental is about 30 cents per square metre, and in addition to this the regular quay dues of $10 per running metre of quay occupied for permanent moorings.

The use of the floating docks is subject to special charges, called "dokgeld."

The port also derives a revenue from the letting of various kinds of small plant and apparatus necessary for the loading, unloading and general handling of merchandise.

The port has a plentiful supply of lighters of all descriptions, but, as their ownership and control are private, no fixed rates for lighterage can be given.

Pilotage within the port is controlled by the city, and is optional. Sea and river pilotage is under the exclusive management of the State. So many factors enter into the proper computation of pilotage rates charged that a full statement of them would be too lengthy and complicated for this report.

The railway facilities enjoyed by Rotterdam are fairly satisfactory. It is connected, directly or indirectly, with the principal railway systems of Europe. The arrangement by which the principal quays, harbors and warehouses are directly connected with the main line of the State Railway must be pronounced very satisfactory. According to an agreement entered into by the city and the above railway company in 1889, the city builds and maintains tracks along all its quays and harbors on the left side of the river, and the company obliges itself to run its cars along these tracks and to admit to them the cars of other railway companies to all points within a certain described limit, and to receive and deliver goods at these points at the rates charged for goods received or delivered at the principal station in Rotterdam. This arrangement leaves no room for local railways, and secures direct trans-shipment of goods without additional expense to the shippers.

The goods shipped to and from Rotterdam are so varied in kind that it is difficult to fix the chief staple of traffic. Among the leading articles of import and export are oils of all kinds, cereals, tobacco, coffee, sugar, spices, liquors, coal, ores, metals, stone, cement, hides, fish and manufactures of different descriptions.

In conclusion, I beg to acknowledge my indebtedness to Mr. G. J. de Jough, director of public works of Rotterdam, for much valuable information courteously furnished me during the preparation of the above report.

U. S. CONSULATE, ROTTERDAM, Feb. 28, 1896.

SOUTHAMPTON (England).

[From the report of HENRY W. MARTIN, Consular Clerk.]

The harbor of Southampton, a broad estuary formed by the confluence of the Itchen and Test rivers, which convert the site upon which the city is built into a sort of peninsula, is, without doubt, one of the finest in the world. At the junction of these two rivers begins what is called the Southampton Water, a noble expanse of

sea, five miles in length, over half a mile in width, and of sufficient depth for vessels of the greatest tonnage.

When the dredgers now at work shall have completed their task, this magnificent approach to the docks will have a depth of 30 feet at low water of ordinary spring tides.

To the left, on entering Southampton Water, is Calshot Castle, a coast guard and customs station, which marks the division of Southampton harbor from the Solent, the stretch of water between the Isle of Wight and Southampton Water, and the beginning of the jurisdiction of the Harbor Board. Once beyond Calshot Castle, safe and excellent anchorage is found in abundance.

The Harbor Board maintains two lightships: one, the "Itchen" light, at the mouth of the river Itchen, and near the southern extremity of the new dock works; the other, the "Spit" light, just outside of Calshot Castle, and marking the deep-water entrance to the Southampton Water. The buoys are in accordance with the uniform system of buoyage, and have recently been supplemented by four gas buoys.

Three of these are put down by the Trinity House, in the Solent, to designate the approach to the port from the westward, and the other by the Harbor Board in Southampton Water. All four are lighted and maintained by the Harbor Board, the owners of the docks contributing largely towards the expense.

The construction of the first Southampton docks was begun in October, 1838, by the Southampton Dock Company, which had a capital of $4,855,500, afterwards increased by half. An act for the construction of the docks was obtained by the company in 1836. This was two years after the act had been obtained for the construction of the London & Southampton Railway, and the two undertakings, so dependent on each other, were carried out almost simultaneously, the railway being opened throughout in 1840, and the 16 acres of tidal or open docks completed and opened in August, 1843. The first year the docks yielded a revenue of $19,530. The inner or close dock was not opened until 1851. This dock is the only one possessing a pair of gates. It is 10 acres in extent, and has a depth of 25 to 28 feet of water, the depth in the open dock varying from 18 feet at low water to 31 feet at high water, or ordinary spring tides.

From 1851 to 1876 the docks seem to have passed through a period of stagnation, as no further additions were made during that time. In 1876 the Extension quay, on the river Itchen, 1,720 feet in length, with a minimum depth of 20 feet at low water, was completed.

This quay is principally used by the Cape and South African mail and other steamers of the Union Steamship Company.

The docks are shut off from the city by solid brick walls, broken here and there by gates and doors, each efficiently guarded to prevent the ingress of idlers and the egress of dutiable goods not bearing the official poster which shows that they have passed the customs. All these gates and doors open on Canute Road, named after the renowned Dane.

On entering the dock yards, one is struck with the network of rails running in divers directions. All of these rails, or almost all, connect with the London & South-western Railway station, just opposite the gates of the dock yards, on the other side of the Canute Road, and enable the trains to be taken right alongside the quays of the adjacent docks, thus permitting both passengers and goods to be trans-shipped with a rapidity and facility common to no other port in the kingdom, and to very few in existence.

Working eastwards, with a slight bearing to the north, the first dock encountered is the open dock, with an entrance 150 feet wide, hereinbefore described. Next in order of importance is the Empress dock, opened in 1890. This superb dock presents a great parallelogram of smooth water, bordered with the massive and imperishable masonry of the quays, which are so enormous that the great liners moored alongside appear small and almost insignificant in comparison. Since its completion this dock has been the pride of the Southampton people, for it has hitherto been unique among the docks of the world in certain striking characteristics. In no other port of Great Britain is there a similar dock into which the largest vessels afloat can steam and take up their berths, load, unload and depart, irrespective of the state of the tide, and at any time of the day and night. It is 18½ acres in extent, has four quays of 850 feet each in length, and an entrance 175 feet wide, with 26 feet minimum depth of water alongside at low water. It is in this great dock that the "Paris" and "New York" and other large steamers, such as the "Nile" and "Danube" of the Royal Mail Steam Packet Company, the "Scott" of the Union Steamship Company, and latterly the "St. Louis" of the American Line, take their station. The advent of the "Paris" and "New York" and other famous vessels of the one time Inman Steamship Company of Liverpool to Southampton followed closely the beginning of a new epoch in the history of the Southampton docks, and that of Southampton as a port.

In November, 1892, the Southampton Docks Company, who laid the foundation-stone in 1838, went out of existence, and the docks

became the property of the London & South-western Railway Company. The sum paid therefor was $6,618,440. This acquisition marks the beginning of the new era of prosperity in the commercial history of Southampton. Possessed of enormous wealth, this great company immediately commenced a series of gigantic undertakings, which have entirely transformed the harbor and docks and raised Southampton to the proud position of being the finest and best-equipped port in Great Britain. Its great natural advantages have been developed and enhanced by modern improvements and inventions, new steamship companies have been attracted to the port, and the city, which some four years ago was comparatively unknown, is now fairly entered upon the great destiny to which her happy situation, natural wealth and delightful climate justly entitle her.

The following is a description of the new quays: the guide stage, reaching from the south dock head of Empress dock, about 300 feet in length, composed of piles and timber framing and deck, and filled up to low-water level with concrete; the east or Itchen quay, composed chiefly of timber and concrete structure, similar to the preceding, 1,600 feet in length; the south quay, 430 feet long, now in process of construction; the south-west or Test quay, 1,500 feet in length, also in process of construction; in all, 3,830 linear feet of quay, with 28 feet of water alongside at low water, and necessitating the dredging of upwards of 1,500,000 to 2,000,000 cubic yards of material. This depth can at any time be increased to 30 feet, the foundations being put in sufficiently deep to admit of dredging to that extent. About 1,150 feet of the Test quay is enclosed by a chalk bank, and the wall will be put in in the dry, as in the case of the graving dock. Another method of construction will be necessary for the outer and deeper portion, and the matter is now under consideration. The following items are of interest, as showing the number, approximately, of men, machines and material required in the execution of the works: 1,100 men; 2,000,000 bricks; 85 locomotives (cranes, etc., 7 locomotives); 10,000 loads of timber; 40,000 tons of cement; 3 dredges; 26 barges and hoppers; 5 tugs and launches, besides immense quantities of granite, chalk, dirt and filling.

The ponderous masonry of these new works, as well as of the old, and the permanent manner in which they are constructed, as if intended to last for scores of centuries, which, indeed, is characteristic of all public works in England, is well calculated to impress a foreigner. Among other improvements and accommodations on the dock estates are a large warehouse on the north side of the Close dock, only just completed, and designed for the accommodation of

grain, flour and general merchandise, including bacon, cheese, etc.; also champagne, which is received in considerable quantities from France, *via* Havre, and stored in specially constructed vaults. This building is 300 feet in length and 100 feet in breadth, and consists of 8 floors and a basement. Like other warehouses adjacent, it is fitted up with elevators, and conveying machinery of modern design, capable of dealing with 100 tons of grain per hour, either from ship, lighter or car. About 100,000 square feet of shedding has been provided on the south side of the same dock for storage of wood goods, in order that such merchandise may no longer be exposed in the open air to the deteriorating effects of weather. A coal barge dock has been constructed on the Itchen for the purpose of discharging coal from the colliers into lighters.

In the close and open docks there are three sets of sheer legs, varying in power from 20 to 100 tons, and a large number of hydraulic cranes of various powers. These latter are of recent construction, and form part of a complete system of hydraulic power worked from the central station near the graving docks. The whole of the company's premises are lighted by electricity from the plant situated in a central station adjoining the hydraulic engine house.

All the quays in the old and new docks and recent extensions are supplied with spacious transit sheds and warehouses, with the railways running alongside and under cover, so that the operations of loading and unloading import and export cargoes may be carried on with the utmost convenience and despatch without regard to the state of the weather. Ice-cold storage room is provided underground beneath some of these sheds, where thousands of quarters of American meat can be stored, awaiting the time to ship them inland.

It is, however, in her superiority as a passenger port that Southampton takes the most pride. The passenger steps from the steamer into a shed, where a special train awaits the arrival of all the liners, has his baggage examined by the attendant officers of customs, and one hour and forty minutes later he is in London, 78 miles from Southampton by rail and 74½ by road. There are also close connections with the fast mail steamers which ply between Southampton and Havre.

The affairs of the harbor are administered by the Harbor Board (or commissioners), composed of the members of the corporation of Southampton and ten specific commissioners, who are practically life members of the Board. The mayor, who is also admiral of the port, is chairman of the Board, and is assisted by a virtually permanent deputy chairman, re-elected annually.

The town quay and the royal pier belong to the Harbor Board, and

are under the direct management of that body. The town quay, an extensive structure of wood, projecting into the river Test from a point some distance above the new dock works, has a quay frontage of 3,500 feet, with convenient berthing and every accommodation for the working and trans-shipment of cargoes of small steamers.

The royal pier, in close proximity to the town quay, and which has lately been reconstructed, also projects in a slightly curved line into the river Test. It is 1,000 feet in length and 36 feet in breadth, and is used for excursion and steamboat traffic, besides affording a broad expanse of promenade flooring. A spacious pavilion and concert hall have just been completed on the pier, as also a branch club house of the Royal Southampton Yacht Club. It is abundantly supplied with comfortable benches, and provided with every convenience for the purposes of recreation.

In the river Test, to the right of the pier, excellent anchorage is found for small yachts, as also in the river Itchen, where numerous private dock yards and yacht-building works are situated.

I am indebted to Mr. John Dixon, dock and marine superintendent of the London & South-western Railway, Southampton, for much valuable information in the preparation of this report.

SOUTHAMPTON, July 18, 1895.

STOCKHOLM (Sweden).

[The report of THOMAS B. O'NEIL, U. S. Consul.]

Answer to Question No. 1:

As the Swedish metropolis is situated midway on the east coast, where the Malaren Lake flows into the Baltic, and where numerous lines of communication by land and by sea meet, the town of Stockholm may be considered the centre of commerce and navigation of these parts.

Answer to Question No. 2:

The port, which is excellent and entirely natural, is large enough to hold all ships destined for these parts, a circumstance which, in connection with its central position, has helped to develop it.

Answer to Questions Nos. 3 and 4:

The port of Stockholm has no docks. The wharves and quays belong to the town itself, and they are under the control of the

harbor master. They have been enlarged in proportion as navigation and commerce have increased.

Answer to Question No. 5:

All wharves and quays within the central part belong to the town, but along the more distant parts of the shore some private quays may be found. There is no mode of participation whatever.

Answer to Question No. 6:

The ships are placed along the quays according to the orders of the harbor master, who also decides regarding the piling of goods on the quays. The harbor regulations contain the necessary instructions.

Answer to Question No. 7:

The town has by degrees acquired possession of the most central shores for the building of quays and roads. Government has also given up parcels of land, when this has been necessary for arranging and enlarging the port.

Answer to Question No. 8:

As there are no docks here, no answer can be given to this question.

Answer to Question No. 9:

In most cases the community has not paid more than the current prices, and the necessary funds have been secured at about five per cent.

Answer to Question No. 10:

The principal income of the harbor is derived from charges on the cargoes, and the owners of the goods pay the landing charges.

Answer to Question No. 11:

Yes.

Answer to Question No. 12:

Connecting railroads exist, and belong to the State.

Answer to Question No. 13:

The development of the town must be chiefly attributed to the regular steamship communications.

Answer to Question No. 14:

There are several transport and tug boat companies which by means of towed lighters carry goods to and from most places along the shores of the lake and the sea.

Answer to Question No. 15:

As the metropolis of Sweden, Stockholm has certain advantages over other Swedish towns. The only city that can compete with Stockholm from a mercantile point of view is Gothenburg, with its excellent position at the outlet of the Gotaelf into the Kattegat.

Answer to Question No. 16:

In this country the municipalities are responsible for all loans raised for the purpose of building ports and quays.

Answer to Question No. 17:

Import: colonial and manufactured goods, petrol, coals, wheat, rye, etc.; export: iron, wood, ore, oats, matches, tar, etc.

U. S. CONSULATE, STOCKHOLM, Aug. 27, 1895.

SYDNEY (New South Wales, Australia).

[From the report of GEORGE W. BELL, U. S. Consul.]

Naturally Port Jackson, the harbor on which Sydney is situated, is the best harbor on the globe. It is land-locked, perfectly protected from winds by considerable elevations in every direction and from tides by various capes, islands and curves in the land formation. There are said to be 1,200 miles of shore line or water front within 10 miles of the general post-office; and while there is no place in the harbor too deep for convenient anchorage, there is sufficient depth at almost any point for deep-sea vessels to lie alongside the shore. Art could not have formed a better entrance, and the interior is capacious enough to hold the fleets of the world, though no ship inside the heads

can get one mile from land. Sydney is the metropolis of Australia, the natural advantages of the harbor being one desideratum. But it is also the capital and chief distributing point of the richest and most populous of the Australian colonies, and the terminus of a railway system of 2,500 miles, reaching out in all directions and tapping the better portions of a country embracing 310,000 square miles. I regard the success of the past as largely due to the location and natural merits of the harbor, though it is managed and controlled with about average skill and ability.

To me the fourth question is meaningless, as I cannot understand how the "ownership" could affect the docks and wharves unless it affected the management. These general remarks cover the first four questions.

Answer to Question No. 5:

A portion of the wharves belongs to the government and a portion is in private hands. As facilities for storing and handling goods at the different wharves are about the same, there is no competition. A portion of the government wharves is leased on short terms, one to the Peninsula & Oriental Steamship Company, one to the Orient Steamship Company, one to the Messaquries Maritime Company, one to the Norddeutscher Lloyd Steamship Company and another to the German-Australian Steamship Company. The government wharves are managed by a manager, appointed by and acting under the colonial treasurer's department, while the private wharves are managed by a trust, called the Wharf Association.

Answer to Question No. 6:

Partly answered in the fifth question. The rules are established by the treasury department for government wharves; and under parliamentary law or regulations the association establish the rules of the several private wharves.

Answer to Question No. 7:

I think this has largely been answered by questions 5 and 6. The government disposed of a portion of the shore line, but the retention of so large a portion secures a uniformity of privileges, charges and management greatly to the advantage of commerce. The government fixes a maximum rate of wharfage, and, having equal facilities, of course indirectly controls charges. The mixed ownership is regarded as beneficial.

Answer to Question No. 8:

Public ownership secures uniformity, but often private management is a convenience to commercial men, as suitable arrangements for special cases can be more readily made. It is not easy to secure a deviation from "departmental" regulations.

Answer to Question No. 9:

In some cases wharves on shore line have been "resumed" by the government, usually by compromise or agreed price, the "needed funds" being especially appropriated by Parliament.

Answer to Question No. 10:

Chiefly from cargoes. Ship charges for berthing are very light.

Answer to Question No. 11:

Only to a limited extent. The roads belong to government, and connect with the government wharves at Darling harbor and Pyrmont.

Answer to Question No. 12:

Only as in No. 11. The rates differ on distance and class, and are fixed by a railway commission with absolute authority. It would be hard to define the basis of charges.

Answer to Question No. 13:

I would say very largely, as the railways centre here, and bring heavy products for export and help to distribute the imports.

Answer to Question No. 14:

Very little lightering is done except for private convenience, as ships can go almost to any of the wharves, there being plenty of water.

Answer to Question No. 15:

No special facilities exist. The geographical position and splendid water frontages make this a grand distributing centre.

Answer to Question No. 16:

Large sums have been spent at Newcastle for coal staiths, etc., to great advantage, and it is claimed at an actual profit. At Wollongong a harbor trust was formed three or four years ago to improve the harbor, so called, but already trouble has arisen, and the money expended so far appears to have been wasted.

Answer to Question No. 17:

General merchandise inwards, and wool, tallow, hides, skins, preserved and frozen meats, minerals, etc., outwards. So far but little export of cereals has taken place.

Answer to Question No. 18:

There was a movement made some years back by the mercantile community in favor of the establishment of a harbor trust. The movement, although directly unsuccessful, caused both private individuals and the government to bring the wharfage accommodation then existing into something better, both as regards jetties and covered sheds thereon. In 1893 the government proposed the formation of harbor trust for Sydney and Newcastle, but on such lines as did not meet the approval of the mercantile community. Political changes have since caused the project to be abandoned.

In conclusion, it may be well to say that in New South Wales most of the public utilities, such as railways, telegraphs, telephones, wharves, sewers and also over three-fourths of the lands, belong to and are controlled by the government, so dedications, resumptions and funds for the same are provided for by acts of Parliament.

U. S. CONSULATE, SYDNEY, Sept. 10, 1895.

APPENDIX IV.

ACT AND RESOLVE.

ACT AND RESOLVE.

AN ACT

To authorize the Purchase, Taking and Improvement of Certain Lands for the Purpose of securing Public Ownership and Control of Certain Parts of the Foreshore of Boston Harbor.

SECTION 1. For the purpose of securing public ownership and control of certain parcels of the foreshore of Boston harbor, the board of harbor and land commissioners are hereby authorized to take in the name of the Commonwealth by purchase or otherwise in fee from time to time within two years from the date of the enactment hereof any and every of the parcels, strips or belts of lands or flats bounding on the United States pier-head line in old harbor and Dorchester bay south of the strandway, as laid out in the Boston park system on the south side of South Boston and north of the lowest bridge on Neponset river, and lying between said pier-head line and a line drawn parallel to and distant shoreward seven hundred feet therefrom; said parcels to be of such shapes and dimensions within the lines aforesaid as said board may determine; also all and singular the parcel, strip or belt of flats situate at East Boston on the easterly side thereof, adjacent to Wood Island park and the city of Boston flats, bounding on the United States pier-head line from its intersection of the line of Sumner street extended, thence to Breed island, and a line drawn parallel thereto and distant shoreward

fifteen hundred feet therefrom, saving and excepting the flats of the city of Boston. All the parcels herein authorized to be taken must be taken within two years of the passage hereof.

SECT. 2. Said board, in order to make any taking by right of eminent domain, shall cause to be recorded in the registry of deeds for the county of Suffolk a description of the lands, easements, estates or rights to be taken, as certain as is required in a common conveyance of land, together with a plan and a statement that the same are taken under the authority of this act, which description and statement shall be signed by said board, and the lands, easements, estates or rights described in said description shall upon such recording be taken for, and shall vest in, the Commonwealth.

SECT. 3. Said board may agree with any person as to the amount to be paid as damages sustained by him for any property taken or injured by said board under authority of this act or any act in amendment hereof; and if such person cannot agree with said board as to the damages so sustained, such damages may be determined by a jury in the superior court for the county of Suffolk, on petition therefor of said board or of said person against said Commonwealth, filed in the clerk's office of said court within one year arter such taking or injury to property as aforesaid; and judgment shall be entered upon the determination of said jury, and costs shall be taxed and execution issued in favor of the prevailing party as in civil cases.

SECT. 4. The treasurer of the Commonwealth shall from time to time on the request of said board issue

and sell at public or private sale, bonds, registered or with interest coupon attached, as he may deem best, in the name and behalf of said Commonwealth, to an amount not exceeding one million of dollars. Said bonds shall be designated on their face "Harbor Improvement Loan," and shall be for a term of forty years, at a rate of interest not exceeding three per cent. The proceeds of said bonds shall be used to meet all damages, costs and expenses incurred in carrying out the provisions of this act by said board.

SECT. 5. In addition to the powers heretofore granted, said board may make contracts for the filling, improvement and use of any or all of said parcels; may dredge channels thereto, and elsewhere in the waters of the port as required; regulate the taking of material from the harbor, and fix lines thereon for filling flats and excavating docks; shall have charge of and administer all the public wharves, docks and foreshore owned by the Commonwealth, and may lease the same in parcels, improved or unimproved, from time to time for periods not exceeding fifteen years; and also may hear and investigate complaints or overcharge for wharf or dock accommodation, or for discriminations with reference to charges of any kind in relation thereto, and make report thereon to the legislature. All takings of land and leases executed under this act shall be subject to the approval of the governor and council.

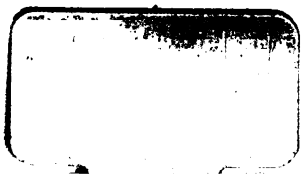
SECT. 6. This act shall take effect upon its passage.

RESOLVE

Relating to the Books, Maps, Plans, Reports and Statistics collected by the State Board on Docks and Terminal Facilities.

Resolved, That all the books, maps, plans, reports and statistics relating to the commerce and harbor improvements in the sea-ports of the world, collected by the state board on docks and terminal facilities, be committed to the custody of the harbor and land commission.

S.

Statis
Term

repo
bor
ected
ties.
d in